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ABSTRACT

This manual is designed to assist schools and organizations in gaining a better understanding of land use at the community, state, and national levels. The manual emphasizes interpretation of maps and photo-imagery to analyze the geographic concepts relating to landscape. The manual promotes the use of local government publications from the U.S. Geological Survey, the U.S. Soil Conservation Service, and state extension services, and the use of space photographs and satellite imagery. The manual lists projects and activities for land use study in social studies, science, vocational agriculture, humanities, environmental education, and 4-H groups. Thorough lists of documentary materials, audio-visual aids, and other resources are included. (MR)

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LANDSCAPES OF VERMONT

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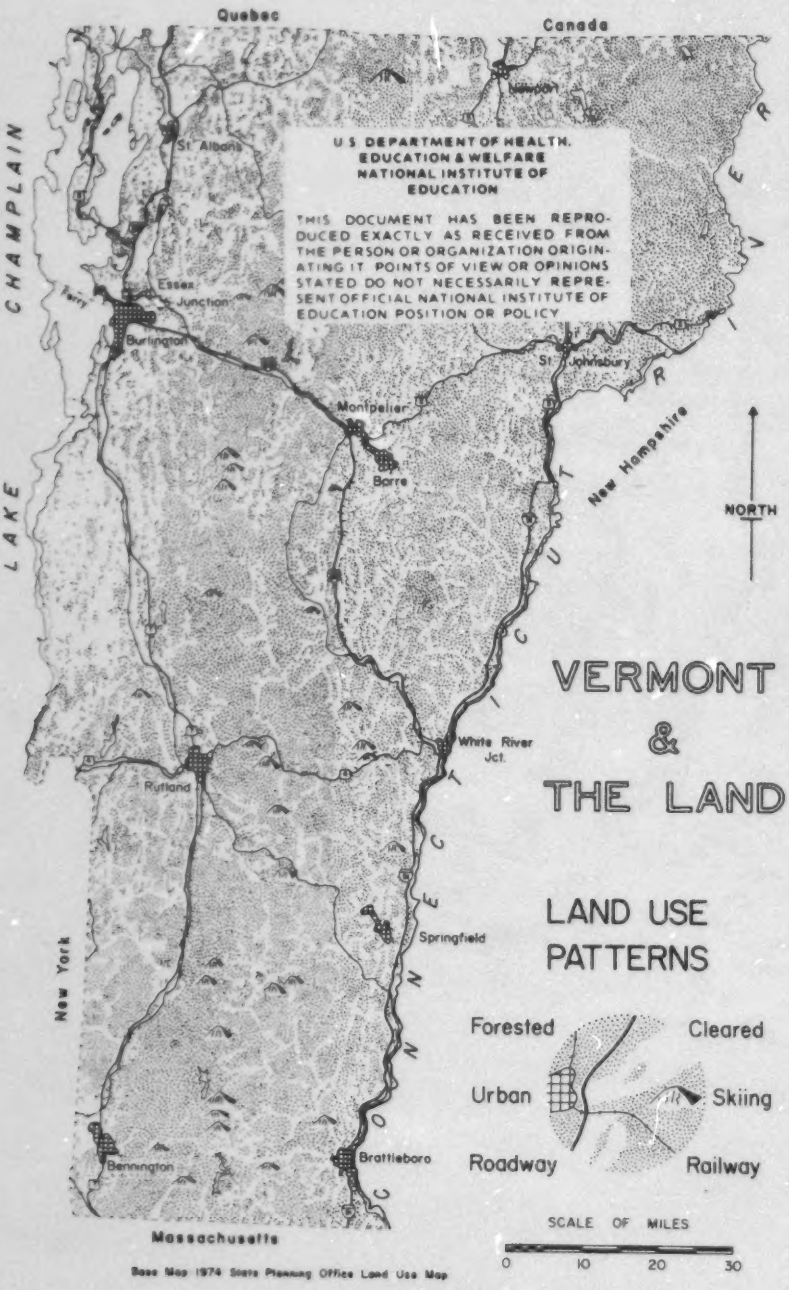

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A Curriculum Guide in
Land Use Education

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LANDSCAPES OF VERMONT

A CURRICULUM GUIDE IN LAND USE EDUCATION

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October 1975

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Foremost among those who have given sustaining support to the environmental education project, "Landscapes of Vermont," from its inception to its final phase are four members of the University of Vermont's Department of Geography: Project Director Edward J. Miles, Remote Sensing Laboratory Director Aulis O. Lind, Department Chairman Canute VanderMeer, and Department Secretary Rita Benjamin. Without their continuing advice and assistance, particularly that of Mrs. Benjamin, the project and this curriculum guide would not have materialized. So, too, the guide owes its production to Project Secretary Eileen Driscoll and Cartographer Thomas L. Peterson.

Special credit is also merited by those UVM faculty members who gave of their time and talent at critical phases of the project: William W. Stone of the College of Agriculture, Russell M. Agne and Charles A. Letteri of the College of Education, and Carl H. Reidel and Thomas R. Hudspeth of the Environmental Studies Program. Geography department colleagues Thomas R. Leinbach, Stewart G. McHenry and Harold A. Meeks contributed vital elements to the project as did Sister Mary Grant, Trinity College's notable geographer, whose expertise in cartography and experience in geographic education provided a uniquely personalized element to the institute phase.

As the project was oriented to the efficient use of government land use publications already in print, special thanks for special efforts in supplying materials for the pilot study groups and institute participants should be allocated to Bruce G. Watson and Arthur Bissonette of the USDA Soil Conservation Service, Mrs. Ruth McAllister of the USGS Map Distribution Service, Vermont's US Congressional representatives, and Vermont State Planning Office Director Bernie Johnson. Their response to a "grass roots" project was most heartening, as was that of private organizations serving the public interest: the Vermont Natural Resources Council, New England Natural Resources Center, and the national offices of the Garden Clubs of America, the Campfire Girls, and the Girl Scouts of America.

Through their local efforts as pilot study leaders and participation in the summer institute in land use education, several Vermonters added particular dimensions to the project. Of the former, three served as institute instructors and curriculum guide contributors: Jack Cross, Dave Orr and Gil Wideawake. Betty Valyou's Lucky Shamrock 4-H group in Jericho provided a noteworthy example of pilot project action, thanks to their selection by Eric Nichols, Chittenden County Youth Extension Agent. Among the many outstanding institute participants from throughout Vermont, Dave Van Vleck and Sonja Stevens also contributed to this guide. One participant, librarian Diane Leyden of South Hero, has indicated that her efforts will be rewarded as the basis of the town's Bicentennial project.

In applying for federal funding of "Landscapes of Vermont" under the US Office of Education's Environmental Education Project grant program, it was jokingly remarked that, "with a group called 'Lucky Shamrock' and a guy named Wideawake, how can we lose!" Nevertheless, to bargain for $32,600 in federal monies with a matching UVM funding of $8,400 required the time-consuming and dedicated efforts of several UVM staff members, in particular Jeffrey B. Aronson of the College of Arts and Sciences and Carolyn E. Hamilton and Catherine M. Lloyd of the Office of Academic Program Support. So, too, the cooperation of the UVM Administration was exemplary, with reference to Deans John Weiger, Abbas Alnasrawi, Robert P. Davison, and Kenneth N. Fishell. Throughout the project we have been aided by UVM's Office of Grant and Project Accounting, with special thanks to Stephen Stoddard and Peggy Rocheleau. At USOE, our Project Officer, George E. Lowe, has been ever interested, a tribute to the oft-beleaguered federal bureaucracy.

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LANDSCAPES OF VERMONT:
A Curriculum Guide in Land Use Education

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INTRODUCTION

"Landscapes of Vermont: An Environmental Analysis" is a project in environmental education initiated by the geography department of the University of Vermont and aimed at assisting youths in schools and voluntary organizations toward gaining a better understanding of land use in their community, state and nation. A specific goal of the one-year project was to promote an efficient and effective method of learning through use of inexpensive, locally-oriented government publications, ranging from US Geological Survey topographic quadrangle maps, US Soil Conservation Service soil surveys, and state land use maps to standard aerial survey photographs, NASA space photographs, and satellite imagery. These materials, readily available for almost all locations in the United States and often obtainable as records of the landscape at different time periods, are geographic tools customarily applied in individual and group studies analyzing the environmental factors related to land use. Many auxillary publications produced by government agencies and voluntary associations serve to augment such studies and to incite interest in land use patterns, a matter of particular concern in Vermont.

Basic to the project is the rationale that citizens perceive "the" environment as "their" environment, hence an attempt to enhance the capacities of individual youths to cope with future land use issues is best promoted by providing tools, the maps and photo-imagery, oriented to their own locale, along with activities, interpretive training and corollary materials for better comprehension of geographic concepts relevant to any given landscape. To this end, the project involved a three-phase approach: 1) pilot studies in Vermont middle and secondary school classrooms and in 4-H Club programs, 2) a two-week teacher/leader institute at UVM in June 1975, and 3) this curriculum guide to aid teachers, leaders and youths throughout the state and nation. As Vermont is a rural state with strong local traditions and large areas of economic depression, a major effort was made to minimize costly capital outlays and disruptions of existing curricula.

A perhaps notable facet of "Landscapes of Vermont" was its attempt to reach youths in varying situations: at several grade levels in a number of subject fields and in 4-H groups, as well as in varied locations: urban, suburban and rural communities throughout the state. Too, the 23 institute participants from 11 of Vermont's 14 counties represented a broad range of Vermont educators from public and private schools in many subject specialties at elementary and secondary levels. They included as well 4-H leaders, a school/community librarian and an adult educator/author. The project staff was no less heterogeneous, for the program was actively co-sponsored by UVM's College of Education, Agricultural Extension Service, and Environmental Studies Program.

Users of this guide must be apprised of two vital editorial provisions: its attempt to be holistic, as should be all environmental education, and its recognition of subject specialization, as is the realistic organization of most educational systems. Thus, the ideas and information given in any one article herein are complementary to several subjects and grade levels. Resource lists are non-repetitive yet are not mutually exclusive, for most duplications were merely omitted. Many suggestions are simple and straightforward; others may require that you become better informed of concepts or better trained in skills. It is impossible, of course, in a booklet of this size to adequately survey and analyze all of the geographic concepts and issues related to land use or to include and assess all of the documentary materials, audio-visual aids and other resources of potential utility to environmental educators. Essentially, this guide represents the kinds of help available to you from your fellow teachers and leaders, your university, and your government. The ultimate responsibility for enlightened land use education rests in your hands. As models, no finer caliber could be cited than two of Vermont's native sons, George Perkins Marsh and John Dewey.

Noel Ring
The University of Vermont
September 1975

LAND USE IN GEOGRAPHIC CONTEXT

Noel Ring

Man-land relations ranks among the earliest of traditional geographic observations. Although the ancient Greeks emphasized the effects of the physical environment upon human activities, today our interests tend to focus on man's impact upon the various aspects of our ecosystem. Because land use is at the center of so many concerns as to our future environment, particularly here in Vermont, consideration must be given toward an environmental education which involves understanding change within a context of constant factors in man's use of the land resource.

Attitudes toward the physical environment have varied over time as influenced by cultural values and economic or technological systems. In the realms of biogeography, geomorphology and climatology we can abstract several concepts related to land use. So, too, our cultural perceptions as to aesthetic harmony in settlement patterns and our technological capacities, as to economic development, can be viewed as giving certain characteristics to the places where we now live and want to live in the future. The "recyclable" game included in this chapter can be adapted to emphasize constant and changing aspects of both physical and cultural landscapes.

Density of population, intensity of land use, and severity of ecosystem stress are three correlative concerns of biogeography, with respect to all creatures. Territoriality and crowding can relate as much to cultural as to biological perspectives on land use. Pollution, in air and water or in sight and sound, and environmental deterioration, in social or ecological stability, can be assessed geographically by particular location as well as general spatial patterns. Information on local and state population densities, land use patterns and pollutant conditions is readily available to most schools. Using census data, maps, air photos and field observations, students can map and assess stress correlations in their own community.

Optimum development of the resources of sun, air and water and of vegetation, soils and geologic substructures should receive attention in land use planning for the future. Significant differences of insolation, precipitation, prevailing winds, and temperatures occur at local levels, providing microclimate variations which can be usefully assessed for land use purposes. For example, given several alternative sites, a subdivision might best be located in the warmest area with houses designed and oriented toward maximum reception of insolation if energy consumption continues to be a major concern Using very simple measuring devices, children can record and analyze the microclimate patterns in their community and apply this data to land use consideration.

Vegetation, soils and geologic features associated with climatic and hydrologic processes can be related to land use patterns quite readily. The economic exploitation of forests as both timber and recreational resources serves as an example of important spatial considerations. Given the problem of selecting a community forest to serve as a multi-purpose area for wood, wildlife, nature studies, and recreation, students can consider such problems as minimal size and optimal shape for species maintenance. The coast redwoods of California require sufficient space to maintain a moist microclimate trapped in the crowns of the towering trees. Deer and quail, often referred to as "edge" animals, thrive upon the ecotonal brush areas between forests and open grasslands. Hence, provided equal area, such wildlife populations might be best supported by a star-shaped rather than a compact forest configuration.

Soil erosion due to poor land use practices is perhaps the oldest of man's negative impacts upon the environment. Primitive man set large fires to round-up game, hence initiating the run-away destruction of vegetation and soils. For military needs during World War II, Japan stripped her mountains of protective forest cover, thus creating severe erosion and flood damages when post-war typhoons lashed the ruined watersheds. Agricultural harvests, in backyard gardens or world markets, require care of the soil resources. In much of America, many areas of prime productive soils have been covered

with subdivisions, industrial parks and super highways. The last consumes four times the amount of right-of-way required by railroads, hence compounding the need for mass transit systems. Certain land uses optimally require specific types of soils and geologic substructures as to drainage and organic-chemical content. By examining their own community, children can assess how well land use actually correlates with soil types. The proper exploitation of America's number one mineral resource, in tonnage mined, suggests that students examine the economic and aesthetic aspects of sand-and-gravel pits in their location.

Although we often conceive of the natural environment as being in a pristine state of ecological stability, a "forever wild" perception, over time Mother Nature has laid a heavy hand in changing the landscape. An appreciation of the effects of natural processes, continuous as in the slow wearing down and rounding of mountains or catastrophic as in their sudden upheavel by tectonic shifts, is requisite to enlightened land use planning. The damming of rivers, even when designed for irrigation purposes, has the negative effect of stopping a flood-supply of the rich alluvial soils upon which so many of the world's farmers subsist. Networks of superhighways have exacted an untold toll on the game trails and migratory routes they transect. Fire is a natural process of landscape rejuvenation and its former over-prevention in modern forest management resulted in unduly large dimensions of destruction when incendiary conditions multiplied. Observations of such phenomena in their own locale may prompt tomorrow's citizens to better plan land use in concert with natural processes.

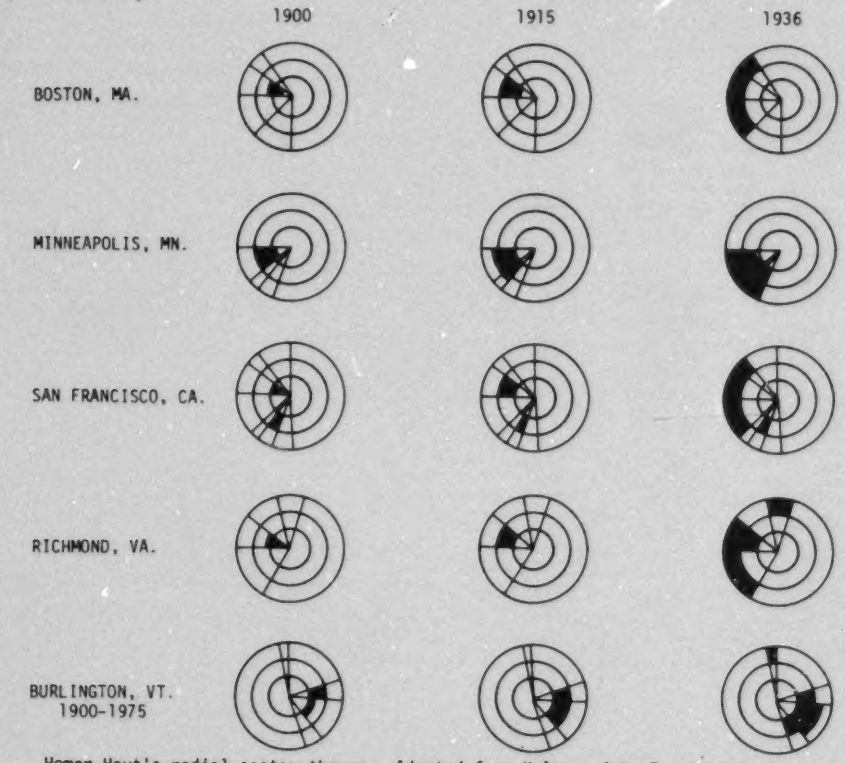
Man's perception of the most appropriate correlation between physical phenomena and human activity often produces, however, a cultural landscape attuned as much to economic preferences, political practices, social systems, religious beliefs or aesthetic values as to scientific facts. For example, New England hill farmers migrating to Canada's Ottawa Valley shunned the rich alluvial floodplain for stony terraces of glacial till, the former being left to French-Canadian farmers whose previous experience and drainage skills eventually won greater agricultural success. In Europe and Latin America, inner-city areas of old and stately homes and elegant apartments have not been abandoned to slum-status by a rush to suburbia. (See fig. 1.) Indeed, in South America, shanty towns ring the edge of cities and cling to hillsides reserved in North America for the most prestigious and high-priced "view lots". Californians, conscious of earthquake hazards, established building codes for strong, stable structures, but let lax zoning regulations often allow construction upon "jello" landfill or precipitous slopes where after heavy rains an avalanche of houses slide down the hillsides. How are natural hazards perceived via land use adaptations in your community?

Characteristics of the landscape in your own community will indicate unique cultural perceptions. The aesthetic and social values of the village green are a hallmark of New England land use. So, too, the white clapboard house with black or green shutters and a steeply-pitched roof to shed the snow. Man becomes comfortable with what he perceives as right and proper landscapes and land uses. The historic selection of a site for settlement may have combined the need for a resource, eg. water power for milling or suitable soils for farming, as well as the location's situation vis a vis other places and access routes thereto, eg. markets or raw materials. Also, appearance is often a very essential aspect of settlement choice, as is familiarity in coping with elements of the environment, eg. soils and seasons. New Englanders heeding the advice to "Go West" initially trekked three thousand miles across Great Plains perceived as a vast, inhospitable desert of unmanageable grassland soils , to reach Oregon with its "look of home". What elements in the local site and regional situation of your community attracted its first settlers?

Historical change in land use is related to many factors, which include shifts in market areas, industrial locations, technological developments, cultural preferences, socio-economic conditions, and transportation systems. The data in Figure 2 indicate some profound changes in Vermont's land use patterns over time, as do the aerial photographs on the centerfold. How have conditions and functions in your community been modified and what factors seem most closely associated with local trends over time? Can we forecast possible future developments in local land use?

Sequent occupance of an area by new waves of immigrants and by continuing migrations of initial settlers often changes both the look of the landscape and the uses of the land. Children today can come to appreciate something of the contributions of all ethnic and cultural groups to the face of America. An appropriate Bicentennial project might be the notation of varied cultural sources of land use practices and landscape features within the county, for there are very few political units of that size in our country which do not contain multi-cultural aspects.

Spatial units organized on the basis of political territory can have a profound influence upon land use patterns, especially when they represent variations in cultural groups, restrictions on trade, or coincidence with contrasting conditions of the physical environment. Consider, for example, what changes in land use patterns might occur if Vermont were joined politically with any one of her four neighbors. Burlington's role as a distant outpost of the Boston market might be distinctly modified were it to be more intimately linked to Montreal. What political considerations influence land use in your community?



Homer Hoyt's radial sector theory. Adapted from Kolars, John F. and John D. Nystruen, Human Geography. New York, McGraw-Hill, 1974, p. 45, by Thomas Peterson (1975).

In Europe and North America certain patterns of urbanization and land use are a common feature over large territorial expanses. The concept of a hierarchy of central places, size and distribution being based on services and functions, is applicable in relationship to population densities. That is, for example, in the more populous eastern half of the United States, one can find a city of 100,000-200,000 or more about every 100-200 miles. Interspersed between them are smaller towns, villages and hamlets in a fairly regular pattern. Distances between urbanized centers in the West are greater as density drops. So, also, the land use patterns surrounding urbanized areas reflect intensity of use and distance to market as economic rent values related to the population size. Accessibility by way of transportation networks also greatly influences land use patterns. The threshold and range of a marketable good or service reflect how far people will travel to obtain such. Inertia plays a large role in industrial land use where mass production attracts a host of customers, capital and labor, thus making relocation very difficult. Heavy industries attract others requiring products of a bulk character not economically shipped great distances.

However, preferences are not always a matter of sheer friction of distance, for old habits and cultural perceptions often outweigh economic determinism. A significant amount of land for medical or special productive purposes, such as arts and crafts, might be found in a very small city where a long tradition of highly skilled personnel is once established. People prefer very distinct landscapes for recreational purposes and these may not be distributed in a regularized fashion. Where do the students in your school go for local recreational activities? What places do their parents choose for vacations and major shopping trips? Is there a pattern to these uses of land?

Fig. 2. VERMONT LAND USE, 1850-1970

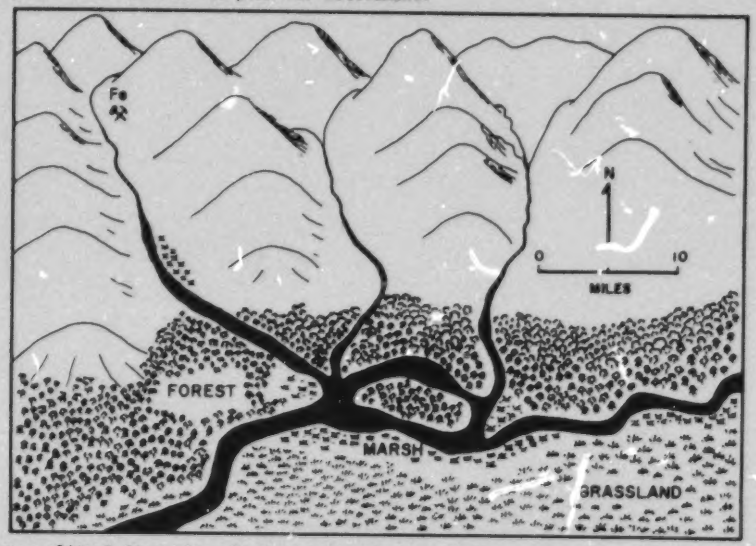
County	Sheep PSM 1850	Cows 1850	PSM 1972	Area % in Farms 1850	% Farmland "Improved" 1850	Area % in Farms 1970
Addison	240	14	45	72%	49%	50%
Bennington	106	10	5	52%	32%	14%
Caledonia	49	19	19	93%	54%	37%
Chittenden	107	24	29	83%	52%	42%
Essex	11	4	4	22%	10%	9%
Franklin	88	25	56	73%	43%	61%
Grand Isle	228	16	52	91%	62%	58%
Lamoille	32	12	17	50%	25%	23%
Orange	104	16	17	78%	51%	37%
Orleans	38	11	36	54%	26%	48%
Rutland	201	19	15	75%	49%	33%
Washington	46	17	10	63%	37%	25%
Windham	75	18	7	84%	64%	16%
Windsor	198	18	7	61%	62%	23%
STATE				70%		32%

PSM = per square mile

NOTE: 1850: 44% of entire state "improved farmland"
1880: 84% of state classed as "farmland"

Data courtesy H.A. Meeks, UVM Geography Department

The following "game" is designed to let your students approach a physical environment as its initial settlers. The setting is similar to Montreal. It requires little more than a few colored ditto masters to recreate the uninhabited site of ones own community, perhaps as based on maps and air photos. As stated above, a host of environmental factors, both physical and cultural, can be emphasized as appropriate to the grade level and subject of the classroom. A useful method of playing such a game is as follows: 1) distribute a "map-picture" to each student with instructions to "do-it-yourself" and be able to "defend your choices", 2) place groups of students, preferably 4-5 per group, of mixed abilities in sets with instructions to "create a group plan", and 3) let each group present and defend its plan for settlement.



Concepts: Site & Situation, landscape perception, land use planning, change, environmental impacts.

Europe: 1000 A.D. - Gronlend Manor

Your group of peasants, led by Sir Giles, seeks a happy haven from war-torn lands. In pen/pencil, outline your new fortified manor settlement. Locate the following (use dots):

Farms (green)	Church (blue)	Toll house (red)
Smelter (black)	Mill (yellow)	Ferries, trails (in pen)

North America: 1650 - New Hope, New England

Your group of skilled laborers, seeking relief from depressed working conditions in the Old Country, establishes a village in the New World. In pen/pencil, outline your village settlement. Locate the following (use dots):

Farms (green)	School (blue)	Glassworks (red)
Foundry (black)	Gristmill (yellow)	Bridges, postroad (in pen)

United States: 1850 - Irontown, Ohio

You've helped build your town from a small hamlet to a budding city, and the newly-formed Chamber of Commerce asks you to prepare a map. In pen/pencil outline the town settlement. Locate the following (use dots):

Farms (green)	Secretarial school (blue)	Packing plant (red)
Ironworks (black)	Railcar factory (yellow)	Barge docks, railroad (in pen)

United States: 2000 A.D. - Futura City, South Dakota

The eastern half of the U.S. is wall-to-wall people, and the President asks you, as Chief City Planner, to locate a "new town" in a less-crowded region. In pen/pencil, outline your model city settlement. Locate the following (use dots):

Truck gardens (green)	University (blue)	Satellite-suburbs (red)
Industrial parks (black)	Recreation areas (yellow)	Airport, highways (in pen)

Topics for Discussion: In addition to brief suggestions offered within the preceding article, teachers and leaders will doubtless incite land use discussions based on the interests and concerns of the youth in their own particular classroom or club. The US Office of Education especially emphasizes the importance of youth individually selecting and directing their own environmental projects. Thus, the following suggestions are designed to serve as sample topical considerations which might provoke youth to devise projects in land use study.

1. The physical site of your community changes very slowly over time by natural processes. Has man, since settling there, made any abrupt or very notable changes? If so, what kinds and why? How was land use involved?

2. The locational situation of your community is influenced by many geographic and demographic factors which often change historically due to shifts in economic activity, technological developments, transportation networks, political conditions, migration and settlement patterns, etc. Can you discover any stages, trends or types of change in your area due to such factors? Based on such development, what might the future land uses be?

3. What determines any given land use: Mother Nature, man, or both? What should determine land use and why? Must there be conflict or can man and nature cooperate to produce a balanced land use?

4. To what degree do "outside" events and interests determine land use in any location? For example, if Bostonians could purchase dairy products more cheaply from Wisconsin than from Vermont, how would that affect the landscape here? What if people ceased desiring granite and marble for monuments and building materials?

5. How do our perceptions of the ideal amounts of space and the visual character of place affect the uses and look of the land? For example, if we built a new town, how would we allocate space to what activities and how would the community landscape appear to a visitor?

6. In what ways do our eating habits affect the landscape? For example, our ancestors consumed fruit and vegetables on a highly seasonal basis, but today we eat many of the same foods all year 'round. How does this influence both our own land use and that of

people in other parts of North America and the world?

7. People need jobs. Industries provide employment, but also consume much land and water and produce pollution problems. How can we devise means of promoting industries which use land properly and attractively? Where would you locate a new industry in your community? Defend your choice!

8. People need recreation areas and access to them. Some of these such as snowmobile trails or bike routes cause conflicts with other land users, both humans and wild animals. How can we design proper community recreational facilities and avoid conflicts with other land uses?

9. Vermont continues to attract tourists, seasonal residents, and new settlers from the crowded regions to the south of us. They bring dollars to our economy, but also different perceptions of land use and landscape. How can Vermonters encourage this economic gain yet regulate changes to avoid undesirable conditions? How has your community been affected?

10. How do planned land use developments differ from unplanned sites and settlements? What kinds of considerations must a land use planner make in allocating land to various uses? What kinds of training would such a person need? If he made mistakes or unpopular choices, how might these be corrected?

11. On what bases do members of your local zoning and planning boards make decisions ? Can these be modified by citizen opinions? What is the rationale for having regional planning boards? Who serves on these boards and what community interests do they represent?

12. People are concerned about their individual rights and privileges as to land use, i.e. the notion that "every man's home is his castle." Yet, would your neighbor have the right to create a smelly, unsightly garbage dump on his land adjoining yours? What are the limits to individual land use rights? What should they be? Does the Vermont Freeman's Oath impose a condition of concern for social and community responsibilities? as to land use? What are the implications of the state's right to eminent domain?

13. Many people want to preserve the traditional landscape and historic landmarks? Is this progress in land use? Who decides what should be preserved, what changed? Is it possible to "have our cake and eat it too?" What would you retain as most important in your landscape? Why?

14. Vermonters once used a great deal more of the land for agricultural purposes, especially in initial settlement and later for sheepraising. Was this good? Now that we are confronted by world food supply crises, should we reconvert more land to cultivation and pasture? How much? Where? What has happened to some of our best farmland with most productive soils? How can we protect prime agricultural land?

15. What kinds of land use planning exist in other parts of the United States? Can we learn anything from them and apply it to our own community and state? Should we support some types of natural land use planning, such as provision for parks and recreation or controls on strip mining and offshore drilling?

16. The location of certain community institutional land uses,such as how sewage treatment plant, municipal dumps, schools, hospitals, convalescent homes, prisons, and airports often cause severe conflicts when no one wants "that thing" next door. How can we resolve these problems? Where would you put such facilities in your community?

References and Resources: With a distinguished heritage from Herodotus through Von-Humboldt, geographers have ever been concerned with the earth environment. Unfortunately, in modern times geographic education became synonymous with countries, capitols, and principal products as did history with names and dates. Today, the thrust of interest in geography has abandoned a foolish philosophical conflict over physical versus cultural determinism in explaining our landscapes and has similarly relegated "nuts and bolts" information to its proper places: atlases, reference books and data banks. Contemporary geographers stress the vital concepts of physical processes and cultural systems of which land use is an integrating element. Among the many synthesizing works of use to teachers as background understanding of basic concepts of land use are standard geography texts and a variety of books related to general environmental concerns:

Darling, F. Fraser and John P. Milton, Eds. Future Environments of North America. Garden City, Natural History Press, 1966; Detwyler, Thomas R., Ed. Man's Impact on Environment. New York, McGraw-Hill, 1971; Detwyler, Thomas R. and Melvin G. Marcus. Urbanization and Environment. Belmont, California, Duxbury Press, 1972; English, Paul W. and Robert C. Mayfield, Eds. Man, Space and Environment. New York, Oxford University Press, 1972; Greenwood, M. and J.M.B. Edwards. Human Environments and Natural Systems. Belmont, California, Duxbury Press, 1973; Hart, John F. The Look of the Land. Englewood Cliffs, Prentice-Hall, 1975; Hewitt, K. and Ian Burton. The Hazardousness of a Place. Toronto, University of Toronto Press, 1971. Salter, Christopher L. The Cultural Landscape. Belmont, California, Duxbury Press, 1971; and Thomas, William L., Ed. Man's Role in Changing the Face of the Earth. Chicago, University of Chicago Press, 1956. Of these, the last listed is a modern "classic" of great value, recently published in paperback edition.A basic aid is Bacon, Phillip, Ed. Focus on Geography, 40th Yearbook, National Council for the Social Studies, 1970.

THE VERMONT GEOGRAPHER

Published periodically by the Geography Department of the University of Vermont, The Vermont Geographer contains articles about the state and its inhabitants. Issue No. 1, produced in 1972, included the following essays: "A Brief History of UVM Department of Geography" and "A 1970 Population Map of Vermont" by Edward J. Miles; "James Wilson: Vermont's Pioneer Cartographer and Globe-Maker " by Sister Mary Grant, R.S.M.; "Vermont's Mysterious Slangs" by H. Gardinar Barnum; "Shore-Zone Interpretation from Radar Imagery of Lake Champlain" by Aulis O. Lind; "Le Rayonnement du Quebec dans le Vermont" and "Survey of Recent Literature on the Geography of Vermont" by Daniel W. Gade; and "Vermont Geographic Regions: A Summary" by Harold A. Meeks. Issue no. 2, to be published in 1975, will include these articles: "The Road Network and Interaction in Vermont: 1796-1824" by Joseph S.Wood; "When Vermont Went West" by John B. Meyer; "Migration to Vermont, 1761-1836" by T.D. Seymour Bassett; and "Historical Geography of the Lakeport of Burlington, Vermont" by David W. Orr.

Copies of The Vermont Geographer at $2.00 each may be ordered from: Geography Department, 112 Old Mill Building, University of Vermont, Burlington, VT. 05401. As indicated by the contents of the first two issues, the publication is of special value to placing land use patterns in historical perspective and also contains useful bibliographic guidance. Additionally, it provides a view of the varied concerns pursued by geographers.

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From your County Extension Agent, obtain two very helpful free brieflets published by the UVM Extension Service in Burlington: "Environmental Education Programs in Vermont, 1973" (Br 1222) and " Available Talks on Environmental Quality in Vermont" (Q173).

The obvious: contact your local town and regional planning commission and zoning board members for information, ideas, speakers and materials!

THE PRIMACY OF VALUES IN THE TEACHING OF LAND USE PLANNING

Charles A. Letteri and Russell M. Agne

As we develop teaching strategies based around the issue of Land Use Planning and Values we might first examine three concepts of valuing: (1) Contextual Engagement, (2) Beneficent Capabilities, and (3) Inherent Characteristics. As shown in the accompanying diagram, each of these concepts suggest a question. The Inherent Characteristics concept suggests the question, "What is valuable about Land Use Planning?" The concept of Beneficent Capability asks, "What benefit is Land Use Planning capable of providing an individual or a community?" And finally, the concept of Contextual Engagement responds to the question, "Why should I study Land Use Planning in my community?" These concepts or areas of value inquiry provide an outline for a teaching model which will suggest appropriate questioning techniques and investigation possibilities. While the definitions of "value," "values," and "valuing" provoke intense debate among educators, our paper regards valuing as an operational process rather than as a definitional determination. We believe that prior to any classroom work on Land Use Planning teachers should ask themselves several key questions:

* How can I make Land Use Planning a personal subject-matter which will engage each student contextually, i.e. relate the topic to the student's personal life at the present time?
* How can I help learners evaluate the benefits or inherent limitations in Land Use Planning?
* Can students demonstrate a position relative to the inherent value of Land Use Planning as a necessary societal process?
* By what processes or procedures can students actualize their value (if indeed they achieve a value) in Land Use Planning?

The diagram below indicates the relationships we see between the three valuing concepts and these key teacher strategy questions. It serves as the reference point for the discussion which follows.

The Valuing Process in Teaching

Land Use Planning

CONCEPTS	TEACHER STRATEGY QUESTIONS
(3) Inherent Characteristics What is valuable about land use planning?	By what process or procedures can I help students actualize their value for land use planning? How can students demonstrate a position relative to the inherent value of land use planning as a social need?
(2) Beneficent Capability What benefits is land use planning capable of providing individuals and communities?	How can I indicate that land use planning is beneficial to the student and his family?
(1) Contextual Engagement Why is it valuable for me to study land use planning or to actualize land use planning in my community?	How can I make land use planning a personal and individual topic so as to engage my students contextually, i.e. relate the topic to the personal life of the student at the present time?

Notice that the teaching strategy proposed begins at the Contextual Engagement Level (1) and builds upward to the Inherent Charateristic Level (3).

Value Concepts and Teacher Strategy Questions

Level 1 -- Contextual Engagement Level:

The purpose of the Contextual Engagement Level is to help students identify for themselves how planning is present and has had profound influence in their lives. Activities during this stage should help learners form associations between events or places in their lives and the role that planning has assumed for them personally. For example, you might ask students to focus on their own home or apartment. Living areas could be diagrammed and the functional aspect (eat, sleep, play) of each space noted. In addition, ask if the function of this area changes with time or with the number of people using it. Appropriate questions might be: Do other activities happen in the dining room besides eating? Does the time of day affect usage? Does the presence of other people affect this usage?

Another approach to engaging students contextually might be to study favorite multiple-use leisure or recreational areas -- indoor and outdoor, commercial and non-commercial, energy intensive and energy conserving, quiet and noisy. Which area is the personal favorite? What determines which area we choose for use? Under what circumstances might the favorite place be given lower priority? Comparing usage plans with others helps one see how a particular use plan is affected by what another person sees as valuable use of that space at that time. Diverse plans will be identified to accomodate the various inherent values of the people doing the choosing. This instructional approach suggested by the Contextual Engagement Concept will engage students in many of the important higher-level factors involved in Land Use Planning but at a personal level.

Level 2 -- Beneficent Capabilities Level:

The purpose of this level in our model is to show how the various use factors studied at the Contextual Level can provide benefits for all segments of the population. It begins to move students away from what might be termed the "egocentric" frame of reference. To work at this phase of the model students could list all members of the family that have occasion to use the home, including the non-family visitor. List the areas each person uses, giving special note to the space each person values most highly. Comparisons of the preferences of people on the lists will point out clearly the different value orientations to certain spaces as demonstrated through the use of that space. Significant discussion questions might be:

* What do the results of this exercise suggest about such concepts as cooperation, sharing, and responsibility?
* Is it possible to satisfy the many usages and values if everyone did what they wanted, anytime that they wanted?
* Who or what really determines the best use of the space?
* Does this imply that some plan for the use of the area is in effect?
* How do you personally benefit from such a plan?
* How do other people help you in your valued usage of the space?

One learning outcome of such a series of questions might be that students will sense that an overall plan, either formally agreed upon or implied, is working to their benefit as well as to the advantage of other members of the family. Possible student-generated ideas might involve: schedules for eating, place at the table, sharing of food, responsibilities for the preparation of food, television watching schedule, rooms for private high value activities, or the sharing of space to accomodate as many of these private high value activities as possible. By soliciting from students additional areas in their lives where plans, schedules or agreements exist, you will be helping them to generalize or expand their concept of planning as they perceive that harmony and accomodation are possible when plans are employed.

Level 3 -- Inherent Characteristics Level:

The Inherent Characteristics helps students extend their concept of planning beyond the level of Stages 1 and 2. At this level in our teaching model, students are aware of the need for planning in their personal and community life, but need skills in how to plan and must now experience some of the problems inherent in the planning process (sharing, accomodation, cooperation, fights, arguments). To illustrate, students might complete an outline map of their own community, recording such features as fire house, hospital , doctors, homes, businesses, factories, play areas, natural areas and schools. After this initial activity ask them to locate these features on a second outline map of the same area but according to their own plan. Small groups of 5-6 are recommended and nurture an understanding of the problems of cooperation and accomodation in the planning process. Discussion time should be provided for individual groups in the class to discuss the relative merits and deficiencies of the locations offered for each community component. For example, in locating the fire department, groups will probably not agree on the same "idealized" site. Subsequent comparison of reasoning between groups leads to a consideration of criteria for locating a particular component of the community. Thus, groups will have to argue the merits of different locations proposed, given the function of the fire department. A similar process is followed in turn for each of the specifics. Shortcomings will soon be discovered in such an isolated siting without an overall community vision. A number of commercially prepared games and simulations are available which generalize the process suggested here. However, Vermont teachers should adopt a local orientation to these materials if they are to be effectively used within the context of our teaching model.

Conclusion

Use of the above inquiry procedures and teaching strategies which encourage the public sharing of personal value systems actively demonstrates the inherent value in a planning process (Land Use Planning). One outcome of this instructional procedure would be the realization that guidelines or criteria for making judgments on land use are desirable and help to make community development a rational process.

* * * * *

OBLIQUE AERIAL VIEWS OF VERMONT - 1967
by F.D. Larsen, Norwich University

Left: Auto cemetery, Lamoille River Valley; Top right: Mountain Road, Stowe; Bottom right: Montpelier. Could you classify land uses shown, estimate changes and predict developments?

MAPS AND PHOTO-IMAGERY: TOOLS FOR LAND USE STUDY

Noel Ring

Geography is sometimes said to be a "science of scale." Two standard geographic tools for examining the environment, maps and aerial photographs, offer an excellent and relatively inexpensive opportunity to gain perspective on land use patterns at a local scale. USGS topographic quadrangle maps and vertical low-altitude black-and-white aerial photographs have been handy instructional aids for many decades and are perhaps fairly familiar items to many teachers. More recently available for almost all locations in the United States are detailed USDA soils maps as well as state and local land use maps providing additional perspective on vital elements of the environment. Applications of of skills associated with these tools are a principle subject of concern of the "Landscapes of Vermont" project.

In Vermont, some of the USGS quadrangle "topo maps" or "top sheets" date from 19th century land surveys whereas others have been very recently updated on the basis of air photo coverage. A comparison of new and old maps can provide clear evidence of changes in land use patterns. Where new editions are available, obtaining older versions may require a bit of hunting, but the effort can be rewarding, as indicated in David Orr's article. The State Library and University of Vermont map collection do, of course, contain early survey maps as may many local libraries. Current editions can be ordered at modest cost from the U.S. Geological Survey, Distribution Branch, 1200 Eads St., Arlington, Va. 22202. Index sheets, indicating the names and scales of maps covering your area can be found at libraries, geography departments, and at various official dealers throughout the state, eg. in office supply, book or sports stores at fourteen locations in Vermont.For example, McAuliffe's Office Supply of Burlington and Rutland sells topo maps at USGS prices, though some agents may add a substantial mark-up.

Once a class or club set of topographic maps is obtained, how can it best be used to examine land use patterns? First, certain map reading skills must be acquired. Second, the specific concerns and interests of individual youths should be considered, as well as any group use that may be planned. Finally, application of the maps to other activities and with other media will enhance the educational utility of this tool.

In regard to map reading skills, the USGS provides two free items of assistance: a single-page key to symbols which aids in an inquiry of what the quadrangle "top sheet" can tell us and a 20-page pamphlet explaining how the maps are made. These should be requested with a map order: "x" copies of "Topographic Map Symbol Key" and the "Topographic Maps" brochure, as well as single copies of any available free indices. Several inexpensive publications will also assist both teachers and students in understanding maps in general and the topographic sheets in particular. One of the best, available from the US Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, is the US Army Field Manual, Map Reading, FM 21-26. Another of great utility and value is David Greenhook's Mapping (University of Chicago Press, 1964) as is Judith Tyner's The World of Maps and Mapping (New York, McGraw-Hill, 1973).

As to individual and group projects, concerns may vary, but a number of examples can be cited to augment interests. If "working with nature" is a voiced value, the maps can indicate areas of slope and natural vegetation which may or may not be used properly where land development occurs. In upstate New York, students could see where the top of a drumlin had been bulldozed away to provide homesites whereas in Essex Junction's Lobier Development, for example, a residential builder was careful to preserve as much of the valley oak vegetation as possible. Land use along drainage basins will indicate an appreciation for flood hazards, agriculturally valuable alluvial soils, and potential pollution problems. Mining sites, as for sand and gravel, are clearly visible as are large segments of land allocated to transportation. A ready assignment might be, "If you were to locate a new industry, eg. a furniture factory, or a major institution, eg. a community college, in our area, where would you put it in order to maintain a harmonious landscape?" Or, a new community reservoir? A dump? A cemetery? A park? The list is limitless!

Obviously, any type of land use planning is best attuned to the application of as much information as can be obtained. Thus, topographic maps can well be augmented by other media at the same local scale, such as soils and land use maps and aerial photographs, upon which both of the latter are most often based. To obtain soils maps of your local area and county, contact the county agent of the USDA Soil Conservation Service. An excellent guide to interpreting and applying these maps is a very modestly priced book by L.J. Bartelli et al., Soil Surveys and Land Use Planning, published by the Soil Science Society of America and American Society of Agronomy, 677 South Segoe Rd., Madison, WI 53711. Local, regional, and state land use map sets offer insights on capabilities for development and proposed general plans. In Vermont, there are three sources of such maps: local town planners, where such exist, the regional planning commissions, which usually cover one or more counties, and the State Planning Office, Pavillion Building, Montpelier, which has published the Vermont Land Capability Plan, including map sets at a statewide scale of four categories: Generalized Land Use, Limitations for Development, Capability for Agriculture and Forestry, and Unique or Fragile Areas, also available in sets for each county of Vermont.

Aerial photographs of Vermont have been taken on a standardized basis since the 1930's. These, as is the case with maps, require reading skills in order to interpret the features shown. Standard vertical black-and-white air photos are flown in such a way as to produce an overlap of flight paths and imagery, thus allowing for stereoscopic viewing and measuring. Unfortunately, Vermont coverage by this method has been somewhat irregular in the sense of areal extent, scale and time. Nevertheless, it is possible to order indices of photographs for almost any part of the state for the years 1942, 1962, and 1974, and for the southern half of the state for 1968, per the following identification data, photo supply source, and photo scale:

1942 Vermont Watersheds (USDA SCS Contract 660-42, Project A.I.S. 25959); General Services Administration, National Archives and Records Service, 8th and Pennsylvania Ave., N.W., Washington, D.C. 20408; scale - 1:20,000.
1962 State of Vermont (Project Vt. - 62-H); Amman.International Corp., 223 Tenth St. San Antonio, TX 78215; scale - 1:18,000.
1968 Vermont Mapping Project (VBM); Raytheon Company, Autometric Operation, 4217 Wheeler Ave., Alexandria, VA 22304; scale - 1:24,000.
1974 State of Vermont (Project Vt.-7420); AeroGraphics Corp., P.O. Box 248, Bohemia, NY 11716.

For Chittenden County, coverage has been fairly frequent, as indicated by centerfold illustrations. Two index sheets cover a 1937 survey: Winooski River, Vt. (contract ALS 14887 Item 1-FY); GSA, per above; scale - 1:20,000; and one index sheet covers a 1956 survey: Burlington Area (Project #56-110); Rist-Frost-Warneck Consulting Engineers, 5788 Washington Road, Box 853, Watertown, NY 13601; scale - 1:12,000.

Most of the 50 states have been similarly and sporadically recorded by aerial photographic missions at the direction of the USDA Soil Conservation or Forest Service, state highway, planning or taxation departments, or other government agencies. In some cases, for special purposes such as regional road, airport, harbor, canal or dam construction, photo coverage is limited to a single county, metropolitan area, watershed or similarly restricted area. Additionally, public utilities,major industries, ski and resort development companies, and other organizations commission aerial surveys from time to time. The best sources of information as to dates, scales and extent of coverage of your community are county SCS agents and state highway departments, libraries and university geography departments. Photo indices and photo sets of almost all government-directed aerial surveys of Vermont can be examined at the State Highway Department in Montpelier and Mr. LeRoy M. Carson, Aerial Engineer, can supply guidance as to government-contracted vertical aerial coverage for most Vermont locations. Surveys of New York areas contiguous to Vermont can be ascertained from Inventory of Aerial Photography and Other Remotely Sensed Imagery of New York State, a $5.00 publication available from the Map Information Unit, New York

State Department of Transportation, State Campus, Albany, NY 12232. Regretably, no such ready-reference exists for Vermont, though this guide serves as a start.

Based on stereoptically-corrected imagery from the 1974-75 aerial survey, the Vermont Mapping Program of the State Tax Department is now producing initial sets of orthophoto-maps of each town in Vermont. Essentially these 80-centimeter square photo-sheets, at a scale of 1:5,000 covering an area of 4000 x 4000 meters, are designed as a base upon which each town is to overlay property line patterns for tax purposes. The State has been sectioned into six regions, divided by towns and subdivided by map coverage, eg. the town of Wilmington is covered by some 15 sheets. To date, maps of only portions of the southern tier of the state are available. Eventually, when mapping is complete, each town office will contain a local set. Index sheets and individual map copies will then be obtainable through the Tax Mapping Division in Montpelier or through its agents. In the meanwhile, this cadastral survey project offers a strong incentive to learn the metric system. All maps and photo-imagery provide excellent opportunities to use mathematical skills.

For assistance in developing skills in aerial photographic interpretation or "API," a number of standard texts and manuals are available as used in college geography courses. Children, however, seem to have little difficulty in handling conventional air photos, once they adopt the "bird's eye view" and discover a few key features: their home, major landmarks, their school, principal routeways, etc. Air photos have been applied in elementary level projects, for example, a second grade urban geography study of Boston. They are a notable inclusion in the High School Geography Project curriculum program sponsored by the Association of American Geographers, Geography in an Urban Age (New York, Macmillan, 1965). The use of inexpensive hand magnifiers will facilitate recognition of some features as will the provision of stereograms, a pair of photos from overlapping flight paths. The latter can be viewed stereoscopically with the aid of student stereo-scopes, though teachers should be cautioned that the 3-D effect is exaggerated and that some children will lack three dimensional depth perception. General aerial stereo atlas manuals and student stereoscopes are among the Earth Science Curriculum Project materials available from the Hubbard Company, 2855 Shermer Road, Northbrook, IL 60062.

The application of aerial photography to classroom and individual study projects in land use is limited only by the interests and imagination of those involved. One of the most rewarding activities associated with the "Landscapes of Vermont" pilot study groups, such as the Jericho Lucky Shamrock 4-H Club and Shelburne Middle School, has been the mapping of land use change as based on air photos. A successful seqence of mapping activities can be conducted to produce an attractive display by following this procedure:

1. Obtain six or eight contiguous photos of the community from each of various aerial survey missions, eg. 1942, 1962, 1974, and overlap each set to form a photo mosaic for a given time period;

2. Using sheets of clear plastic, such as acetate, overlay the mosaics and obtain colored marking pens such as Sharpie for delineation of significant land uses, removable with carbon tetrachloride;

3. Have students devise a color-keyed categorization of land uses, eg. transportation routes, commercial and residential areas, agricultural lands, forests, and woodlands, water bodies, etc;

4. On each overlay, mark the appropriate land uses, then put the overlays together to create a pattern of land use change; and

5. If desired, add an additional overlay sheet to record the specific areas of change per time period.

Variations to this basic procedure can be arranged to promote individual concerns and field observations. For example, give to each student, or to a small group of students, a copy of a not-too-recent air photo with a markable clear overlay sheet (used x-ray film from a local hospital may be obtained at no cost) and assign a community area for mapping of land use changes. Or, if an individual is interested in a special type of land use, eg. present and potential recreation sites, location of community garden plots, Bicentennial recreation of the original settlement patterns, plotting of proposed bicycle paths, etc.,

mapping can be conducted by both on-site and air photo examination. Two specific activities of great value are:

Field Mapping: in company with topo maps and air photos, use the "Instant Mapper," a simple do-it-yourself device developed by Walt Bennett, US Forest Service, Siuslaw National Forest, Hebo, Oregon 97122. For example, selecting bicycle trail routes would be a popular activity. Useful guidance comes from Bicycling for Recreation and Commuting, a US Departments of Transportation/Interior brochure available for 45¢ from the US GPO (ID# 1972-0-461-880).

Orienteering: this fast-growing interscholastic sport provides opportunities for combining several physical education and recreation skills with environmental interests. Traditionally, it is a game involving use of topo map and compass to locate pre-selected site-markers. Those who traverse the course most rapidly by cross-country running and hiking win the match. Cross-country skiing could also be applied as can specific skill assignments at each course site, eg. at site #1, list five wildflowers or tree species; at site #2, list four visible land uses; at site #3, count traffic on highway for 5 minutes, etc. Numerous variations are possible. This sport of competitive navigation should be incorporated into school programs at all levels. Schools wishing to broaden their environmental education programs might well use it as basis for a mini-grant application to the USOE.

Basic information on orienteering may be obtained from Silva, Inc., LaPorte, Indiana 46350, which retails compasses and relevant publication, eg. John Disley's Your Way With Map and Compass: Orienteering, published by the American Orienteering Service, 308 West Philmore Ave., Colorado Springs, CO. 80907. Another source of useful materials is the Canadian Orienteering Federation, Box 6206, Terminal A, Toronto, Ontario M5W 1T6. During the summer of 1975, the US Orienteering Federation, P.O. Box 1081, Athens, Ohio 45701, sponsored a teachers' workshop in cooperation with the geography and physical education departments at Ohio University.

Additional Resources and References

Scale: for an understanding of this concept, in vivid protrayal, obtain at least one copy of Kees Boeke's book, Cosmic View (New York, John Day, 1957). This is a practical item for the classroom and teachers might well make a slide set of the illustrations to augment its great utility.

Teacher aids.: The National Council for Geographic Education has published a wide variety of extremely useful, inexpensive resource materials relevant to community studies and geographic tools. Among them are: McDermott, Paul et al. Globes-Maps-Photographs: Geographic Tools, Topics in Geography No. 4; Parker, Edmond and Michael Conzen, Using Maps as Evidence: Lessons in American Social And Economic History, Instructional Activities Series IA/A-12; Gross, Herbert, The Home Community, Do It This Way , No. 4; and Richason, Benjamin and Carl Guell, Geography Via Aerial Field Trips, Do It This Way, No. 6.

The NCGE's notable Journal of Geography, a prime source for all environmental education endeavors, regularly contains articles of great value. Relevant to the present topic, for example: Stoltman, Joseph and Thomas Goolsby, Jr., "Developing Map Skills Through Reading Instruction" and Marsh, Colin, "The Rationale Behind H.S.G.P. - An Outsider's Interpretation" in May 1973 (Vol. 72, No. 5) issue and Ritter, Frederic and Salvatore Natoli,"The Local Community: A Textbook for Teachers" and Muehrcke, Phillip, "Beyond Abstract Map Symbols" in the November 1974 (Vol. 73, No. 8) issue.

The USDA Economic Research Service has published a series of inexpensive air photo atlases of land use in various sections of the country. Most applicable is The Look of Our Land, An Airphoto Atlas of the Rural United States: The East and South (Washington, D.C. Superintendent of Documents, USGPO, 1971).

Vermont map coverage: the best guide, in historical context, is Cobb, David A., Vermont Maps Prior to 1900: An Annotated Cartobibliography, his MA thesis at UVM, published as a special double issue of Vermont History, Vol. XXXIX, Nos. 3 & 4, Summer and Fall, 1971. Appendices include sections on U.S. Geological Survey Mapping, early Sanborn Fire Insurance, Crafts plans and town boundary maps.

Contemporary graphic protrayal of the state in over one-hundred maps of physical, economic and cultural patterns is to be found in the new and extremely handy book by Harold A. Meeks, Geographic Regions of Vermont (Hanover, Geography Publications at Dartmouth, 1975). Most maps are rendered on a town basis and on a common scale, providing ease of making overlay transparencies. A bargain at $3.75 plus 25¢ mailing fee, this book answers many questions related to land use. It can be ordered from the Geography Department, Dartmouth College, Hanover, NH 03755.

REMOTE SENSING: A NEW LOOK AT LAND USE

Every 9 days LANDSATs I and II record environmental conditions in Vermont from some 570 miles in space. This set of eyes in the sky, formerly called the Earth Resources Technology Satellite or ERTS, follows a sun-synchronous, polar orbital path across the United States and provides a constant stream of imagery of changing land use patterns, snow cover, plant growth, lake levels and a host of other phenomena. Remote sensing is a term used to describe the technology and techniques of scanning, receiving, processing and analyzing data recorded by such tools as LANDSAT.

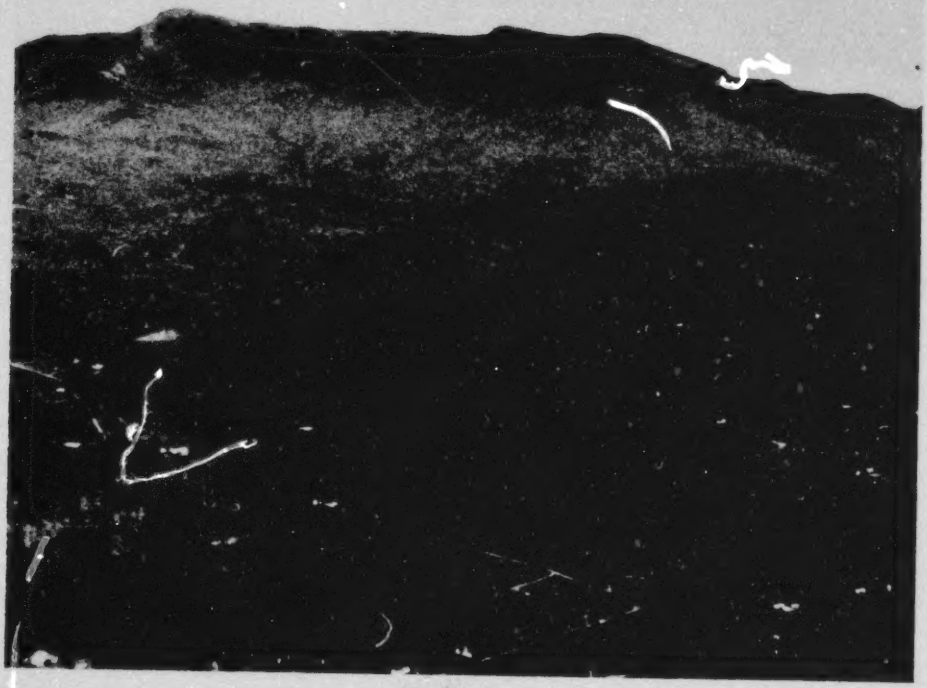
Based upon measurements of electromagnetic energy reflected or emitted from scenes or objects, remote sensors can be operated from a variety of "platforms": aircraft, balloons, manned spacecraft, and manned or unmanned satellites. Individual sensing systems record in selected wavelengths, ranging from the ultraviolet, through the visible and infrared bands, into the microwave section of the electromagnetic spectrum. LANDSAT, for example, has four scanners, two of which register in the near-infrared band and two visible. Other systems may record thermal patterns or, indirectly, the presence of water.

Analysis of remote sensor imagery depends upon the signature concept: that each scene or object has characteristic reflectance properties termed a "spectral signature." The changing tonations of reflected electromagnetic energy indicate environmental changes, as from crop to crop or from turbid to calm water. Computers can be programmed to recognize these signatures, encode them on tape, and produce maps of the patterns registered. The geography department at Dartmouth College has developed an expertise in automated systems to produce land use maps of the greater Boston and New Haven areas and of New Hampshire. At the Remote Sensing Laboratory in the University of Vermont's geography department, lake studies of pollution, turbidity and flooding have attracted special attention.

Remote sensing devices generally record data by one of three systems: photo-optical, electro-optical, or microwave, which can be classified as either passive or active. Passive sensors, such as cameras, radiometers and scanners, record only naturally existing energy whereas active sensors, such as radar and laser systems, emit their own signals at a target and record the reflected energy. Many remote sensing projects, such as the forthcoming USGS Atlas of Urban Change, involve a wide variety of imagery to accurately assess land use change: LANDSAT imagery, high-altitude photography from U-2 overflights, various low-level photography, and "ground truth" field observations. Sky-lab imagery and photography from other manned space flights have proved useful in many environmental studies, especially those involving broad, regional patterns or large-scale problems.

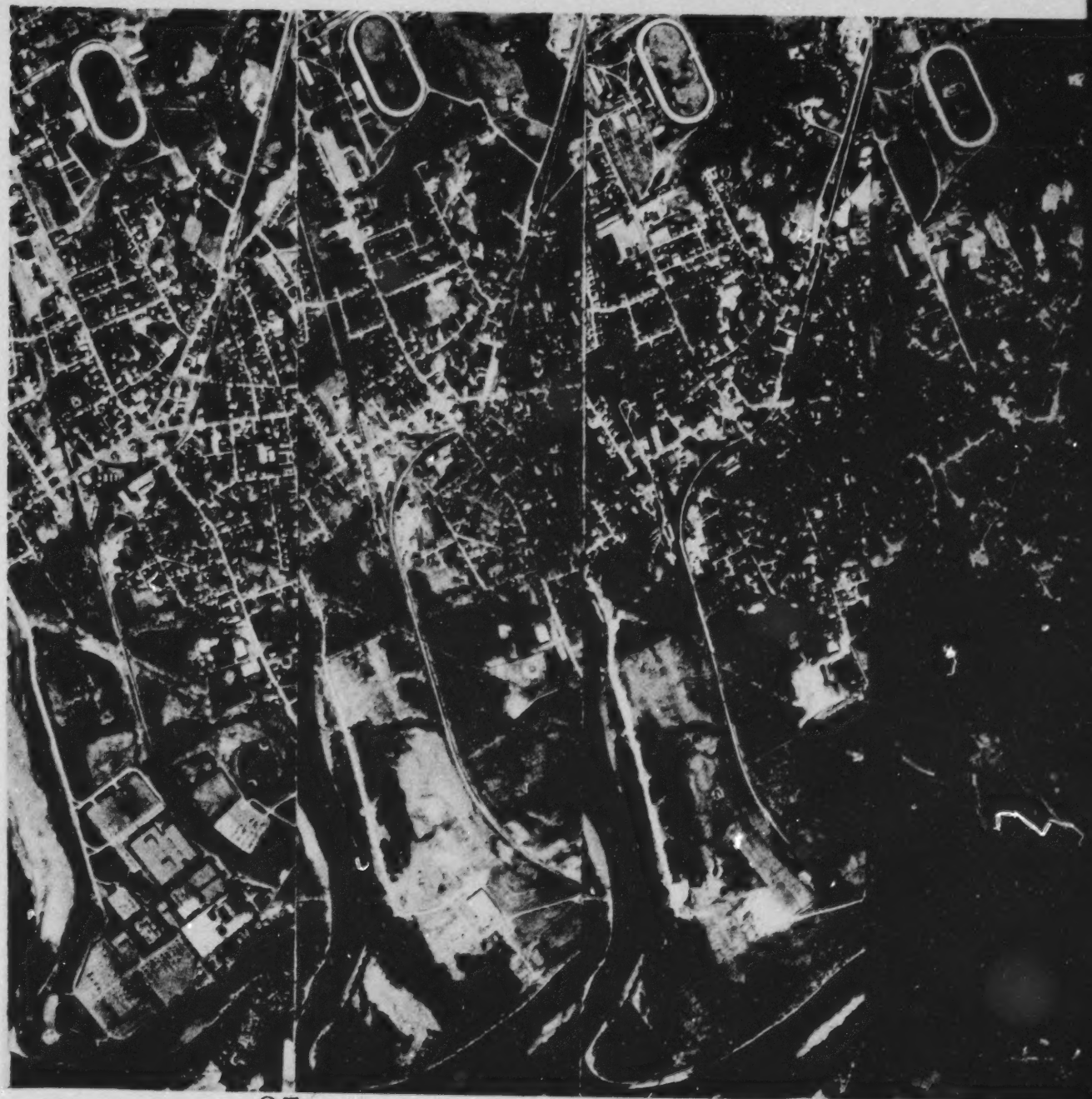
Teachers wishing to prepare for incorporating remote sensing materials into their curriculum might best consult the most useful basic text in this field, Robert D. Rudd's Remote Sensing: A Better View (North Scituate, MA, Duxbury Press, 1974). This inexpensive paperback book contains a fine, color print section of imagery and is very lucidly written. Although few New England institutions of higher learning offer regular courses in remote sensing, opportunities exist to enroll in "short courses" or workshops, eg. as sponsored by the Association of American Geographers at the annual meetings of the National Council for Geographic Education and the New England-St. Lawrence Valley Geographical Society. Additionally, given sufficient demand, the UVM Continuing Education division would no doubt supply course offerings.

In the meantime, several forms of remote sensing materials are both readily available and fairly easily interpreted without either advanced training or expensive technological aids. LANDSAT imagery can be fruitfully examined by simple hand magnifiers to identify



Essex Jct.

1974 1962 1956 1942



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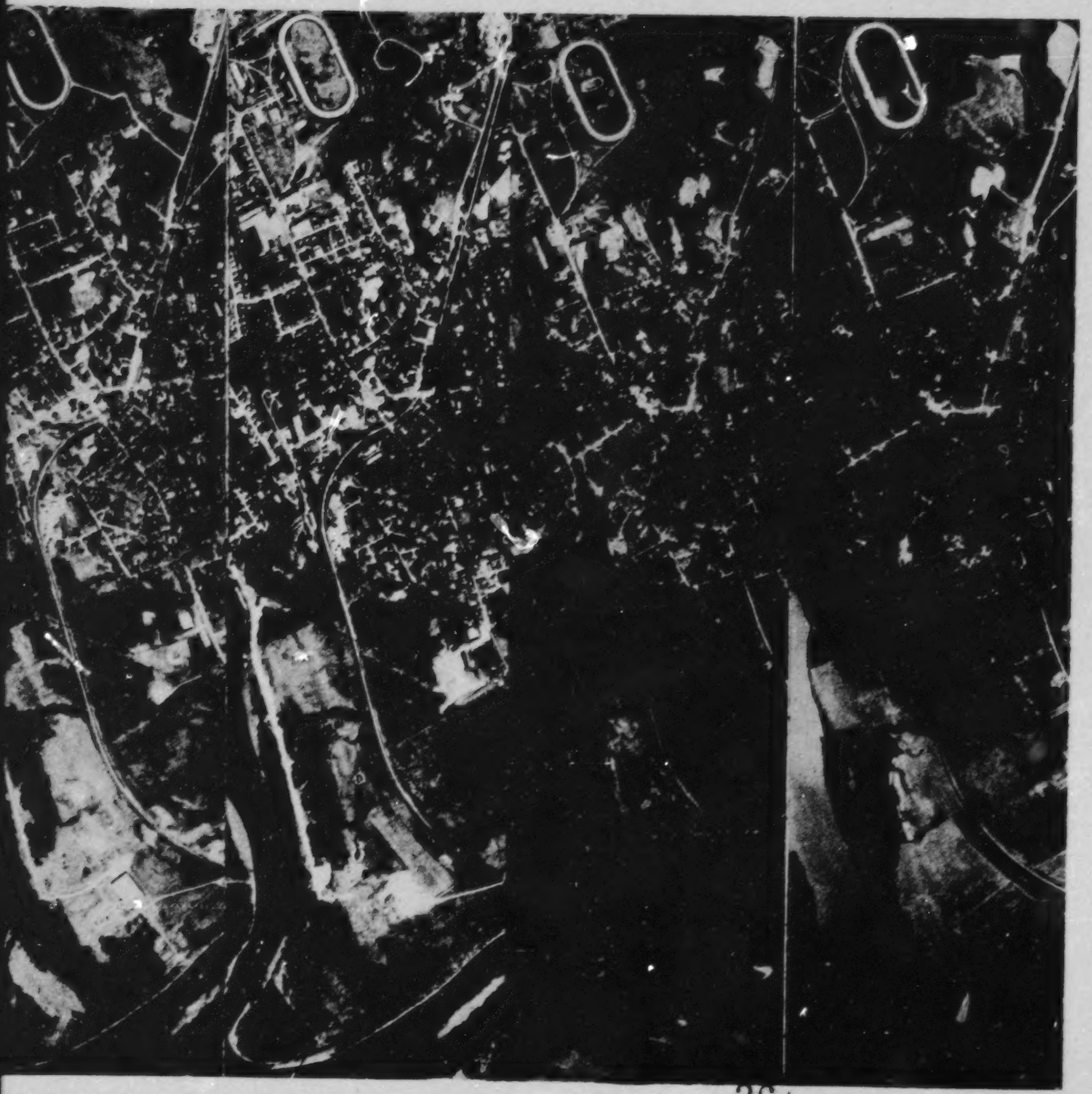
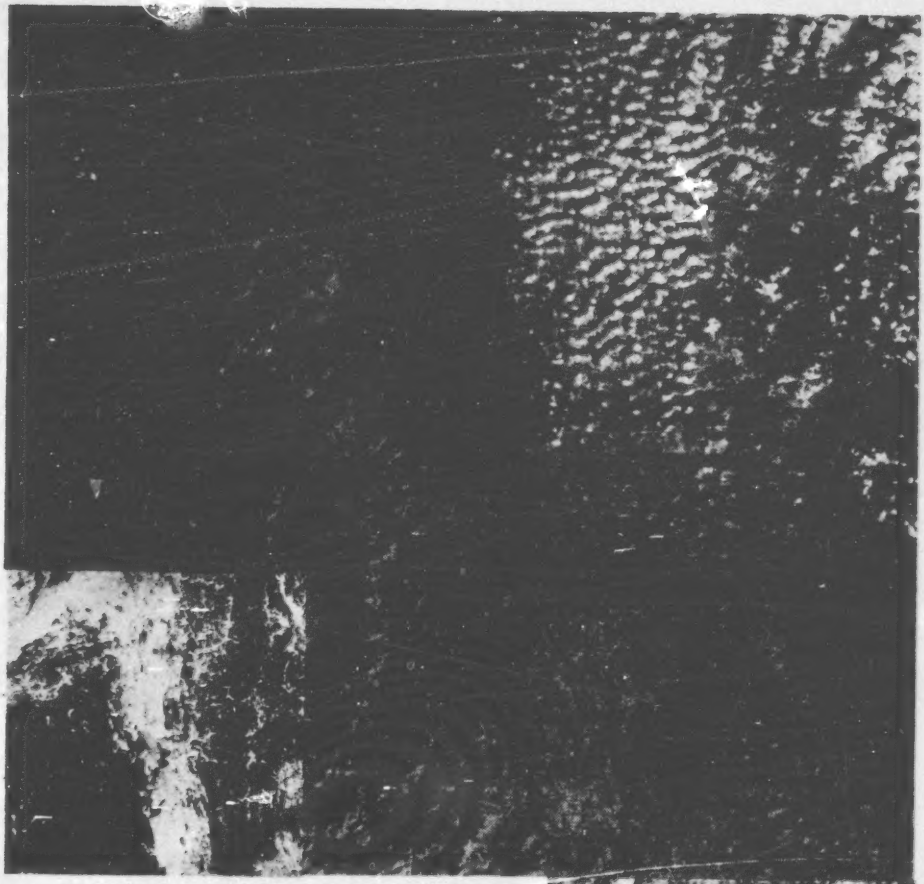
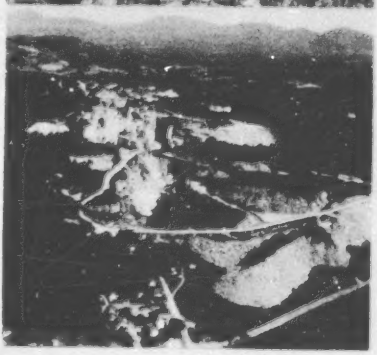
1962 1956 1942 1937







VIEWS OF VERMONT OVER HALF A CENTURY

In August 1924, the US Army 8th Photo Section recorded land use near Underhill and Mt. Mansfield (p. 21 top, courtesy of John Smith, UVM Photo Service). The same scene was captured in September 1975 by Noel Ring and Thomas Peterson (p. 21 bottom). Five decades of land use change in Essex Junction are recorded on the centerfold: Vt 7420 4-207 & 5-038 (5-2-74); Vt-62-H 20-218 & 21-40 (5-10-62); 56-110 7-024 & 7-057 (5-25-56); DCC-2-174 (8-8-42); and FY-1-44 & 45 (8-14-37). LANDSAT (ERTS) imagery of the Lake Champlain Basin, above reduced, 1079-15115-6 (10-10-72) and insert 1565-15074-4 (2-8-74) portray seasonal patterns, the winter snow cover revealing farm fields and transportation routes. With a hand magnifier, look for the Barre granite quarries, due east of Berlin Pond (right). Oblique view (1967) by F.D. Larsen, Norwich University.

gross land use patterns, land survey systems, hydrologic conditions, drainage patterns, snow cover, etc. Both space and high-altitude aerial photography are also "readable," especially once accustomed to the color infrared rendition in which much of it is taken. Vermont, however, has not been covered by very much imagery from manned spacecraft. The UVM Remote Sensing Lab contains a high-altitude CIR survey of the Lake Champlain shoreline and a copy of a radar survey of the Burlington area as well as a large supply of LANDSAT imagery and conventional aerial photography.

The following teacher aids and classroom materials will provide a "starter set" for those desiring to explore the exciting views of land use recorded by remote sensing systems:

Audiovisual aids: two 35 mm slide kits costing $20-25 each are of special value: the NEED slide-cassette kit on LANDSAT, "Earth Resource Monitoring from Space," from Talcott Mountain Science Center, Montevideo Road, Avon, CT 06001, and the "Land Use Patterns" high-altitude aerial CIR slide-and-guide set (PRI-10S) from GeoPub Media Service, Tualatin, OR 97062. NASA has produced a number of good movie films. Send for their catalogue to NASA Johnson Space Center, Audiovisual and Motion-Picture Production Office, Code JL131, Houston, TX 77058. A 30-minute program on LANDSAT "500 Miles from Earth," has been produced by Connecticut Educational Television Network, 24 Summit St., Hartford, Ct 06106.

Publications and Periodicals: A veritable gold mine is The Directory of Aerospace Education ($1.00), published by the Journal of Aerospace Education (subscription: $5.00) at the National Aeronautic Association, 610 Shoreham Bldg., 805 15th St., N.W., Washington, D.C. 20005. For additional help, contact the National Aerospace Education Association, Middle Tennessee State University, Box 59, Murfreesboro, TN 37130. A subscription to NASA's quarterly Report to Educators is free from Educational Programs Division, Office of Public Affairs, Code FE, NASA, Washington, D.C. 20546. RSEMS: the quarterly journal of the AAG's Remote Sensing Committee costs a modest dollar to the Editor, Center For Applied Urban Research, University of Nebraska at Omaha, Box 688, NB 68101. New England residents can profitably contact the Educational Office of NASA Goddard Space Flight Center, Greenbelt, MD 20771, for guest speakers and sundry assistance, such as how to obtain a copy of Skylab Experiments, Vol. 2: Remote Sensing of Earth Resources Information for Teachers, NASA Educational Publications, and the 1975 Photo Index.

Imagery: two principal sources of space-platform imagery can provide actual classroom materials: the Technology Application Center, University of New Mexico, Code 10, Albuquerque, NM 87131, has catalogues of Gemini, Apollo and Skylab photographs available as slides and in other formats, including slide sets by topic, such as geology, oceanography, etc. The USGS EROS Data Center, Sioux Falls, SD 57198, also supplies manned space-craft and aircraft photography and is the principle source of ERTS/LANDSAT imagery. The best way to obtain information from EROS is to send the geographic latitude-longitude coordinates of your location and ask for a computer print-out of coverage plus a "Standard Products Price List."

Miscellany: The National Geographic, Vol. 135, No. 1, January 1969, contains a well-illustrated article on remote sensing. Dames and Moore, Suite 3500, 445 South Figueroa Street, Los Angeles, CA 90017, has published in their Engineering Bulletin 45, of August 1974, a good survey, five copies free, additional $2.00 each. Many aerospace engineering firms will supply sample material in brochure form at little or no cost. The free USGS brochure, "Studying the Earth From Space" (INF-71-17R-2) is also very useful.

To date, a multi-scale, multi-sensor view of any given local environment is difficult to find in print. Perhaps being forced to compile your own has value. For field observations see Adams, W.P., "Geography and Orienteering," Journal of Geography, Vol. LXXI, No. 8, November 1972, pp. 473-480, and May T. Watts' Reading the Landscape (New York, Macmillan, 1967). For combining topo maps with corresponding air photos, see Blair, C.L. and B.V. Gutsell, The American Landscape: Map and Air Photo Interpretation (New York, McGraw-Hill, 1974).

* * *

* John Stevens, Environmental Education Coordinator in the State Department of *
* Education in Montpelier has loan copies of the NEED slide kit on satellite imagery, *
* an item available at state education offices throughout the northeast United States *

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HOW MUCH WILL IT COST?

How much will it cost? This is inevitably the first question school administrators will ask when confronted with a request to implement locally-oriented land use studies of the type proposed in this project. Because most of the materials involved are either government publications or government-contracted productions, prices tend to be minimal and to be least affected by general inflationary factors. The following represents a supply suitable to repeated use as a classroom set for 30 students. Obviously, such a set could be shared by several teachers. Very little equipment is required to make good use of these materials.

Maps	
15 USGS topographic quadrangle maps, local area @ $1.00 each	$15.00
5 USGS topographic quadrangle maps, surrounding region, for bulletin board display and teacher use	5.00
15 state land use maps - possibly available in sets- prices will vary - best estimate would be $1.00 per set of four	15.00
15 county or local area land use maps (again, possibly sets)	15.00
15 county USDA SCS soil survey maps	free
15 SCS local area soil survey map sheets, if available, 10¢ each	1.50
subtotal	$51.50
Air Photos	
15 stereo-pairs (15 one photo, 15 contiguous), local area, ca. 1940-50, at $2.00 per photo	60.00
15 stereo-pairs, local area, most recent coverage	60.00
8 photos, ca. 1940-50, contiguous for mini-mosaic bulletin board display	16.00
8 photos, most recent coverage, per preceding purpose	16.00
1 photo index, ca. 1940-50 coverage, for display and ordering	8.00
1 photo index, most recent coverage, for display and ordering	8.00
subtotal	$168.00
Space Imagery	
15 ERTS 1 or 2 (LANDSAT) b/w prints, local area, 1:1,000,000 @ $2.00	30.00
5 misc., per above, for state/regional mosaic coverage @ $2.00	10.00
subtotal	$40.00
Grand total: maps, air photos, space imagery	$259.50

GOVERNMENT PUBLICATIONS

Resource references of great utility are these publications of the federal government: USDA Soil Conservation Service Agricultural Handbook #296 Land Resource Regions and Major Land Resource Areas of the United States; USDA, Soil and Water Conservation for a Better America; The Citizens Advisory Committee on Environmental Quality, Community Action for Environmental Quality; USDA, Build Our American Communities; on the subject of rural development, A Guide to Federal Programs for Rural Development; Annual Report of the President to the Congress on Government Services to Rural America; Rural Zoning in the United States; for general reference, The Quiet Revolution in Land Use Control; USDA Annual Yearbook of Agriculture; and Selected Resources for the Study of Human Ecology. Perspectives on the Environmental Crisis compiled by Lynne Manring and Jon Seger, Smithsonian Institute. The majority of these publications may be obtained through your congressman.

SOCIAL STUDIES PROJECTS IN LAND USE CHANGE

David W. Orr

A major goal of land use studies in the social studies is to help people understand their surroundings better. Why is something located where it is? Why do people use the land as they do? What are historical, present day, and possible future land use patterns? In other words, we are looking at the past, present, and future by means of land use patterns. Student comprehension of the trends which have brought about different types of land use will help them decide wise uses for tomorrow. If people are better educated, perhaps in the future their decisions on land use will take into consideration long-term as well as short-term environmental effects.

Vermont is located on the fringe of a number of heavily-populated areas. It is now feeling the pressure from these crowded areas as many people are moving to the state seeking refuge from overcrowded areas. Whether Vermont becomes an overdeveloped, congested place to live depends in large part on how well land use planning is utilized. If people are well-informed as to what is needed for controlled growth in the state, there is a good chance orderly growth will occur. Students at an early age should be exposed to the problems that uncontro'led development can bring. By examining land use patterns they will hopefully develop an understanding of what land capability is and why it must be considered in planning present and future land use.

Land use studies can promote many skills such as the ability to read and interpret information from a map, to design maps, to read and identify information on air photos, to collect data and summarize information, to work with others in groups, and to organize individual projects. Some of these skills will be of immediate use in other school subjects; all of them will be of use if the students are to make informed decisions about their environment as adults. The local area serves as a very good source for examples of land use patterns and gives students a better understanding of the community which makes up their environment. The following material is designed for junior high students; certainly variations can be made for older as well as younger students.

Instructional Materials

Maps: topographic, land use, soil, road and street, historical town or city maps, zoning maps, and outline maps of the town or local area.

Air Photos: of the local area. If possible, these should be photos taken some time apart and from different altitudes.

Pocket Stereoscopes: To study air photos in three dimensions.

Reading Materials: Historical descriptions of an area during different time periods; old photos are also useful.

Government Publications: many booklets, books, and land use studies published by local, state, and federal government agencies can be helpful in the classroom as source material for independent study projects and can be inexpensively obtained. These should be ordered well in advance of the dates needed to insure having them in time for use.

Activities

Introduction to Air Photos

A class activity useful in teaching students both familiarity with air photos and map making is one using air photos to make maps. Students have to convert the features shown on the air photo into symbols and patterns to be represented on a map. Many types of maps can be made this way. Map scale can also be illustrated with air photos taken

at different altitudes. This is a good way to see how students perceive information on air photos and can translate it into map form. It also delineates land use, such as industrial, commercial, and residential, and offers opportunity to develop skills in grouping or ordering data.

One approach is to give the students air photos and tell them to make a map from what they see thereon. A simpler approach is to add questions helping them identify specific information for their maps.

Example A: Natural Features
1. Are there any mountains or hills shown?
2. Are there any rivers, lakes, or oceans shown?
3. Can you see any forest land or fields?

Example B: Man-Made Features
1. Are there any roads? If so, are some larger than others?
2. Can you see any towns or cities?
3. Can you identify any specific buildings?

Students can work alone or perhaps with a partner, for best results. To help students interpret information from air photos after they have completed their maps, circulate topographic maps of the same area and assess reasons for varied interpretations of the data.

Studying Land Use Change

Much of the historical development of an area can be understood by looking at the history of land use and the reasons for land use change. Especially useful are maps of a specific area, such as the town in which the students live, air photos, and any written descriptions of the area at different time periods. Abby Hemenway's Vermont Historical Gazetteer, (Burlington, Vermont, 1868) includes the early history of Vermont towns. A very good model is Robert M. Carter's The People and Their Use of Land in Nine Vermont Towns, (Burlington: UVM Agricultural College, 1947; Bulletin 536).

Early maps of the area and historical records often give descriptions of the land use patterns at a given time in history. For example, many early industries no longer exist but there may be visible evidence yet remaining. In many communities mills were once located on a creek or river. Most of these have long since ceased operation, but at the site some evidence remains such as dams, old buildings, roads, foundations. Many types of former land uses can be seen in this way, eg. old mines and quarries and railroads tracks and stations. Field trips to various sites can be organized by use of old maps indicating the location of these past forms of land use. Air photos taken during the past four decades can be obtained for most areas. Examining examples from ten or twenty-year intervals can vividly incite interest in land use changes.

This method of investigating one's own community can bring about a greater awareness of the environment and how it developed. Discovering what brought about land use changes leads to many research topics using local historical information, such as creation of maps showing location of early and current industries or maps of active farms at one period in time compared to the presently active farms in a given town.

A large group project is construction of a model of a town or city showing its former land use patterns. Early maps would be the best source for information for this project; for early maps of Vermont towns see the Beers Atlas series on Vermont counties published in 1869 and found in many town libraries. The Charles Tuttle Company of Rutland has published a series of copies of these atlases and they are more easily available.

An example of the study of land use change applied to a specific place was conducted in Burlington, Vermont, and concerned itself mainly with the Burlington waterfront. It is divided into four parts, and can be applied or modified for other local areas.

I. An introduction by the teacher involved a brief description of the historical factors that brought about many of the land use changes on the waterfront. This gave students some background information about the area.

II. Using air photos from three time periods, eg. 1937, 1962, and 1974, and topographic maps of the area, students could discover land use changes over a recent period of time.

III. A field trip was taken to the waterfront area to observe firsthand the land use pattern and view what evidence of past land uses remained.

IV. Discussion and evaluation.

The field trip answered many questions which occurred when students examined the air photos, but many more questions arose when students viewed existing land uses and sought reasons for their locations,eg. "Why are oil tanks located all over the waterfront and not in just one area or off the waterfront altogether? Is the land on the waterfront being used today in a good manner? If not, what is a better way?" Students were able to look at past and present, and think about future land use for a specific area having particular problems of environmental management.

Present and Future Land Use

By looking at past land use and present patterns, students can learn to judge good land use and bad. If they live in an area that is or has experienced rapid growth, they will see many examples of overcrowded housing developments, traffic congestion, pollution caused by overcrowded conditions, and problems about locating new schools, housing developments, industries, or transportation routes. Hopefully, there will also be some examples of land use that have been carefully planned by taking into consideration effects on the immediate environment as well as that of the future.

A type of project useful for group work would be locating a new route for a major highway in your local area. Determine what factors must be considered in choosing a route, eg. cost, soil conditions, landforms, ownership of land affected, displacement of people or property and size of road. All are typical problems that must be solved in such a project. Soils, land use, topographic and property maps, air photos and a base or outline map of the area, on which the proposed route can be plotted, will be helpful tools. Each group can select what they consider to be the best route and explain and defend their choice to the class.

Projects such as this give students an opportunity to experience problems associated with planning future land use and also give a chance to draw on knowledge of present land use problems. They can formulate values about how they think land should best be used and actually take part in the type of decision making that is involved in planning future land use. Other, similar projects could be to find locations for housing developments, industry, vacation homes, shopping centers, recreation areas and bike routes. If possible, various projects could be put together to make a master plan for the town so that students can appreciate some of the problems of town planning and see that no addition to the town should be made in isolation but only as part of the whole.

Once students have learned systematic methods of studying land use and the skills associated with such methods as directed by the classroom teacher, they will be able to pursue individually-directed projects with the confidence that their efforts will meet with community appreciation and indeed, in some cases, actual application as part of local land use endeavors. This is one step in career education as a land use planner. Historical geographic study of land use change is a vital aspect of the interdisciplinary training needed for management of future environments.

References and Resources: In addition to many items appropriately cited elsewhere in this guide, several items are especially applicable to social and historical studies of land use in Vermont:

Robert Burley Associates. People on the Land: Settlement Patterns for Vermont. Waitsfield, Vt.; prepared for the Vermont State Planning Office, 1973. For a copy, write to Montpelier.

Carter, Robert M. The People and Their Use of Land in Nine Vermont Towns. Burlington UVM State Agricultural College, 1947; Bulletin 536. Now out-of-print, this superb historical, geographical study in rural sociology deserves both re-printing and up-dating.

Gazetteer of Vermont Heritage. Chester, Vt., National Survey, 1966.

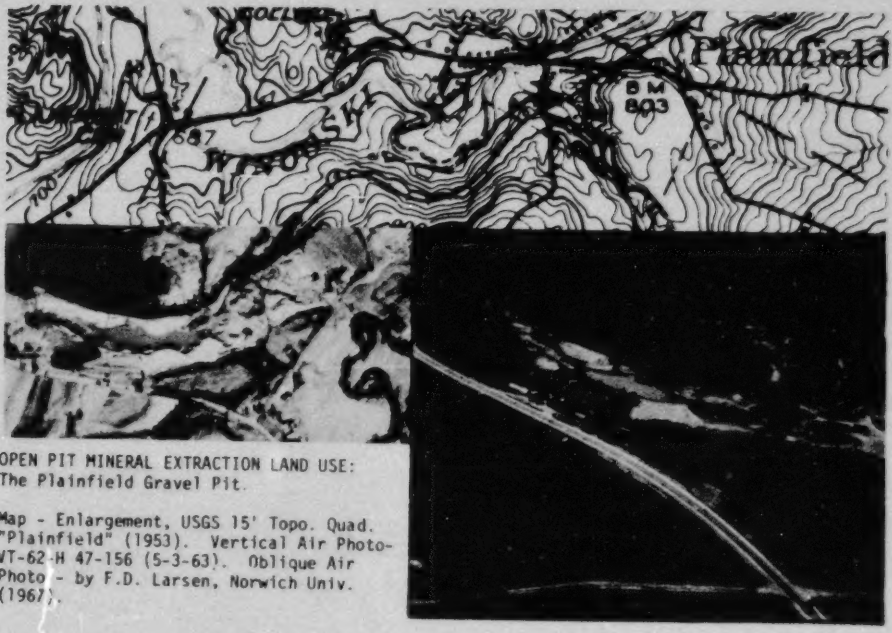
Hemenway, Abby M., ed. The Vermont Historical Gazetteer. Burlington, Abby Hemenway, 1868. A classic compendium by a noted historian.

Lamson, Genevieve. "Geographic Influences in the Early History of Vermont" in Essays in the Social and Economic History of Vermont. Montpelier, Vermont Historical Society, 1943.

McManis, Douglas R. Colonial New England: A Historical Geography. New York, Oxford University Press, 1975. A fine perspective available in paperback; very good bibliography.

Myers, Phyllis. So Goes Vermont (Washington, D.C., The Conservation Foundation, 1974). Subtitled, "An Account of the Development, Passage, and Implementation of State Land Use Legislation in Vermont," this booklet is usefully compared to Slow Start in Paradise, the same author's coverage of Florida land use legislation and to Charles E. Little's The New Oregon Trail. All three are available at modest cost from the same publisher.

Several of the many land use publications by UVM resource economist Frederic O. Sargent may prove useful. These include single copies available at no cost unless specified: "Scenery Classification," Report No. 18, UVM,Vermont Resources Research Center, 1967, reprinted 1971; "Lake Champlain Basin Studies," UVM Extension Service, 1972. ($5.00); "Guidelines for Quality Environment Planning," Pamphlet 38, Vermont Agricultural Experiment Station, 1974; "Alternative Methods of Keeping Land in Agriculture," Article No. 310,VAES, 1973; "Proposed Open Space Plan for Chittenden County," UVM Department of Resource Economics, 1972; "A Quality Environment for Chittenden," UVM Dept. of Resource Economics, 1974; "Vermont's Act 250 - Enabling Legislation for Environmental Planning," VAES, 1974; "Physical, Economic, Administrative and Planning Regions in Vermont," UVM VRRC, 1964; "Vermont Resources, Extent, Management, and Development Potential," UVM VRRC, 1964; and "Principles of Regional Planning," University of Vermont, 1967.



OPEN PIT MINERAL EXTRACTION LAND USE:
The Plainfield Gravel Pit.

Map - Enlargement, USGS 15' Topo. Quad. "Plainfield" (1953). Vertical Air Photo- VT-62-H 47-156 (5-3-63). Oblique Air Photo - by F.D. Larsen, Norwich Univ. (1967).

SCIENCE EDUCATION AND THE LAND

David B. Van Vleck

What are some practical activities that we can use to teach land use principles to young people? The purpose of this paper is to provide some answers to this question. Land conservation, like water and air conservation, becomes more necessary every day. It is important to teach an understanding of land conservation at an early age. The ideas presented in this paper are the results of research and experimentation on my part during the past year. All these ideas can be improved upon. I used them in grades 9-12, and I present them here in no specific order or priority. They are a skeleton that any interested person can build on to make them more relevant to his own needs.

Land use education is important because there is a limited amount of good soil and we must learn to use it wisely. Land use is determined by other factors, such as population density, housing needs and laws, amount of available water, industrial potential, distance from cities, income level of the people, etc. Land use modifications may result from technological changes or from pressures for short-term financial gain. We often become belatedly aware of irreversible changes, as our concerns for solving today's problems rarely include a consideration of creating land use conditions suited to future generations. We must learn to use soil for its chemical and physical properties, not simply for its dollar value, in order to maintain its productive capacities.

1. Learning soil types: Use A Guide for Land Judging in Vermont, published in April 1971 by the Soil Conservation Service and Vermont Agriculture Teachers Association. An SCS office is located in every county. This teaches the various soil types, their limitations, and what types of structures and developments should be built on each soil type. It is a great source for any grade level. SCS personnel will gladly come into the classroom and explain soil types, soil uses, limitations, implications of Act 250, and so forth. They bring charts and other illustrations that help students to understand clearly the basic concepts of land use. For learning uses for soils in conjunction with types, obtain the SCS soil surveys and maps that are now being completed for most counties in Vermont. These describe the physical character of soils for the entire county and indicate the best usage, limitations, and restrictions for each soil type. Each student can locate his home site on the soil map, which is useful for individual field study-projects.

2. Studying Act 250: older students (grades 11-12) can read and discuss Vermont's Land Use and Development Law, obtained from the State Planning Office in Montpelier. Combine this activity with the question of why land use should be dependent on soil type. For example, the permeability of soil influences septic tank systems installation, therefore whether a development should be considered for a certain site, eg. see Soils and Septic Tanks, SCS publication AIB-349.

3. Conducting lab and field activities: Soil analysis with a soil analysis kit shows some of the more important elements of a soil. Soil concentrations of such elements as phosphorus, nitrogen, and potassium can be found. Then the class can discuss these elements' functions in all living cells of plants and animals. This is the chemical part of soil that complements the physical characteristics considered above. Ask your "Ag" teacher or SCS agent to help locate test sites for soil pits as outdoor labs.

As to weathering and erosion, how is soil made and distributed? All soil is made from rock and is broken down by physical and chemical means, called weathering. Gravity moves it to lower elevations, usually by water, in a process of continually breaking it down.

into smaller particles. Details of these processes can be found in any earth science or geology book In measuring erosion, I was lucky to have a river, Otter Creek, on the school property Thus, we could take a cross-section profile of the river with a rope and a lead pipe tied to the end. Knots at regular intervals showed the depth of the river. By using a stopwatch and dropping sticks into the river and timing how long it took a stick to go a certain distance, we found the speed of the current. We took about 18 readings at 10-ft. intervals across the river to get an average speed and an average depth. With the cross-section of the river and the speed, we calculated the volume of water per day during each month. By taking samples of the water, evaporating the water and weighing the suspended soil, we calculated the amount of eroded soil passing by in the river. It is handy to have a bridge from which to take the measurements. By calculating on a map the approximate area of the watershed we could guess at the amount of soil erosion per acre. A less complicated method to estimate erosion is the use of a secchi disc to see the amount of soil in suspension. A secchi disc is a white piece of metal that is lowered into the water. It can be seen at greater depths in clear water than in muddy water and is a good indicator of relative muddiness of some waters; thus, it is a relative indicator of soil erosion upstream.

Regarding fertilizers and organic material, soil fertility is important to teach. "Humus," "duff," "litter" are terms for the decaying matter on the land surface. Such matter becomes organic fertilizer which is a crucial component of a fertile soil. Hay, leaves, manure, sewage, etc. are examples and should be discussed and demonstrated by field observation. In a related concern as to plant-soil associations, can we tell the type of soil by the type of plants growing on it? Yes, especially the trained person can. Ecology textbooks are good references for such associations, as are the local SCS and state or US forestry personnel.

If possible, get students involved in outdoor classrooms or nature trails. These help greatly to teach land use and to increase awareness of associations between land use, conservation, biology, ecology, wildlife, and so forth. The references below will aid in studying soils, conducting lab experiments and creating outdoor facilities. They tell "how and why," offer good illustrations, and all are SCS publications.

Early American Soil Conservationists. MP-449. A Bicentennial bonanza, though heavy reading. Appropriate to many interests and subjects: history, literature, science, agriculture, etc.

Outdoor Classrooms on School Sites. PA-975. Gives suggestions on what to do, not much advice on how or why.

Know the Soil You Build On. AIB-320. Tells much about soil and what to look for before building a house. Very good; many pictures. Students will like it. See also Know Your Soil. AIB-267.

A Conservation Plan for a Developing Area. PA-1029. For high school students, tells how to control erosion.

What is a Farm Conservation Plan? PA-629. Good for Vermont students; explains land use on farms and describes maps as made by SCS and presented in county soil surveys. Very good, and important.

Soil Erosion- The Work of Uncontrolled Water. PA-260 Many photos, easy wording for students, good.

What is a Watershed? PA-420. Short, easy to read for students.

Sediment. PA-325. It's filling harbors, lakes and roadside ditches. Many good photos. Student reading.

Conservation Goes to Town and Creative Learning Experiences in Conservation. For teachers. Pictures. How water, soil, conservation affect urban development; varied classroom and field activities. These are reprints from the SCS periodical, Soil Conservation.

Soil and Water Conservation in Suburbia. Pictures, good reading for high school. Maps development, conservation in suburbs. Good for Burlington or large towns.

Five Teachers Guides:

a. Locate, Plan, Develop, Use an Outdoor Classroom. Excellent for building an outdoor classroom needed for land use study, biology, etc.
b. Soil and Water Conservation Activities for Boy Scouts. PA-348. Many pictures and illustrations, explains how to do the activities. Develops appreciation of soils. A terrific pamphlet. See also Conservation Activities for Girl Scouts. PA-1009.
c. An Outline for Teaching Conservation in Elementary Schools. PA-268. Good ideas and questions for discussion in class and for projects. For high school use, also.
d. Teaching Soil and Water Conservation - A Classroom and Field Guide. PA-341. Science lab exercises for middle and high school levels. Exceptionally useful.

Of the many useful publications available to link land use and wildlife, those of the National Wildlife Federation are perhaps best known. A natural outdoor education area of note is that at Camp Keewaydin near Salisbury, Vermont operated in conjunction with the UVM Environmental Studies Program and is directed by Abbott T. Fenn of 40 Cushing St., Ashburnham, Ma. 01430. In regard to natural areas, the University of Vermont maintains nine areas throughout the state under the direction of the Environmental Program. Listed below is a very brief sample of relevant publications, the first two being SCS pamphlets of special value, the next two being US Forest Service bulletins.

Making Land Produce Useful Wildlife, FB-2035, and More Wildlife Through Soil and Water Conservation, AIB-175 . The former is a superior production as to ecological relationships between a healthy balance of wildlife and high farm yields. The latter will appeal to younger children.

Teaching Conservation Through Field Trips and Audiovisual Aids. FS-61, and Materials to Help Teach Forest Conservation, FS-28. are excellent educational aids. Another useful item is the USDA's current film catalogue. The US Forest Service, Green Mountain National Forest, assists environmental education workshops with a land use program and also offers other study aids. Contact the Forest Supervisor, Federal Building, Rutland, Vermont 05701.

Bulger, John D. Wildlife of Farm and Field. Washington, D.C. National Wildlife Federation, 1969. Easy-to-read descriptive list of common animals. Pamphlet is well worth 10 cent cost. Good bibliography, though dated.

New England Natural Resources Center. Protecting New England's Natural Heritage. Boston, 1973. Describes action program to conserve significant natural areas.

Of great value as a science teacher's resource, is the US government's The Fifth Annual Report of the Council on Environmental Quality, 1974, Supt. of Documents, $5.20. This gives 90 pages on land use problems, developments and solutions, plus 500 other pages on related topics such as population, pollution, natural resources, energy, minerals, etc. Another item is Ed and Carolyn Robinson's The Have-More Plan, available for $2.50 from Garden Way Publishing Co., Charlotte, Vt. 05445. Giving practical solutions that the individual can use to live on his land in the most efficient way, self-sufficiency is an integral part of this booklet. "A little land - a lot of living" is the motto and it deals with the specifics of gardening, of building a small house and barn, of having animals, of composting, and living a conservation-oriented way of life. It brings land use, resource use, money use and other uses to the personal level. For the students who are wondering how they will cope with many increasing prices and pressures and who are thinking about how they want to live their lives, this is a terrific booklet. Many pictures, tables, and figures to illustrate the interesting text. Written for high school level and adults.

In summary, teachers can show that proper scientific land use is a part of the solution to the problem of poor planning. Along with land use, we must consider the size and density

of the population, employment opportunities, natural resources, housing codes and needs, availability of water and transportation systems. In essence, we need to discuss what type of growth or nongrowth we want, a growth policy that fits with our values, desires and dreams for ourselves, our state, our world and our children's world. Governor Salmon is no longer concerned solely with land use planning, but is now looking at a growth policy for Vermont. In this regard, maybe the paper I wrote with the Vermont Natural Resources Council is relevant. It is free, is called A Population Policy for Vermont, and addresses the various facets of the growth problem, not just population or land use alone.

* * * * *

At the Chittenden County 4-H Fair, the pilot project Jericho "Lucky Shamrock" Club members displayed land use studies based on 1942 and 1962 aerial photographs plus topographic, soils and land use maps. Members conducted an on-site survey of present-day land use and transferred the data to a map. They could then create several models to illustrate changes in community land use patterns: a air photo mosaic, a papier mache land use relief map, a large transparency overlay set showing conditions in 1942, 1962, and 1975. They were able to abstract, categorize, and clearly indicate vivid trends in the modification of Jericho's cultural landscape over the past few decades.

Credit for the very successful Jericho 4-H Club land use mapping project rests with the imaginative dedication of the members and their leader, none of whom had any formal training in air photo interpretation or map analysis and construction. Shown in the photograph above are, standing left to right, leader Mrs. Betty Valyou, Jean Lumbra, Susan Valyou, Raymond Haversat and Ruth McCuin, and, seated, Michelle Lehouiller and Diane McCuin. Members range in age from 10-17 years, averaging 12-13 years. The Jericho Lucky Shamrock's land use project was also displayed at the Champlain Valley Fair. They won an educational exhibit cash award.

VOCATIONAL AGRICULTURE TEACHS LAND USE

Gilbert Wideawake

Land is the basic resource for society and vocational agriculture has been synonymous with land use management since before 1917, when with the passing of the Smith-Hughes Act, federal funds were made available for farmers and prospective farmers. Later, one of the major objectives of vocational agriculture was clarified to "Conserve Soil and Natural Resources," a fundamental land use practice, as described by Lloyd J. Phipps in Handbook on Agricultural Education in Public Schools (Danville, Illinois: Interstate, 1966). In 1963, with the passing of the Vocational Education Act, monies were appropriated to expand agriculture education to include off-farm occupations, which increased student enrollment. The program growth brought to the classroom a broader concept of land use education.

Today the State of Vermont, with its broad offering of programs, facilities and equipment, has many tools for teaching land use. Programs vary from prevocational agriculture training to one, two and four year programs in Ornamental Horticulture, Forestry, Conservation, Outdoor Recreation, Agriculture Mechanics, Agricultural Supplies and Services and Agricultural Production. Vocational Agriculture Departments vary from one instructor to four instructor departments with over 200 students. Facilities and equipment in some of these departments may include over 7,000 square feet of floor space and over $50,000 in equipment.

The broad programs, equipment and facilities are only one tool used to teach land use. Another important teaching "tool" is the FFA (Future Farmers of America). In 1928 the first national convention was held in Kansas City, Missouri. During 1951 Congress granted the FFA a Federal Charter with the passing of Public Law 740. Another significant change in the FFA occurred in 1965 when the NFA, a black vocational agricultural student organization, merged with the FFA. Four years later the FFA changed the constitution to allow all vocational agriculture students to become members, thus bringing an increased enrollment of female students. Also in 1969 the Work Study Abroad program began expanding our already growing interest in foreign agriculture. Today the FFA is approximately 500,000 members strong helping each other prepare for challenging careers in the field of agriculture.

FFA is intra-curricular and part of the high school vocational agriculture curriculum, however the practical laboratory FFA offers extends beyond the classroom and local community into state, national and international activities through contests, leadership conferences, materials and travel. Thanks to the National FFA Foundation, Inc., many of these opportunities are free or held to a minimal fee for the members. The program of activities is prepared by the students after school starts in the fall. This allows the teacher to strengthen his curriculum by coordinating his unit with the group's list of goals. Activities assigned to these goals should be relevant to the subject being taught as well as educationally and economically feasible. On the accompanying chart is a sample program of activities related to land use education. Such a program of activities could be continued with any of the following list of goals as to forest and agricultural land use:

1. Sponsor a Forestry Day to demonstrate forestry equipment, skills, practices and appropriate land use selection.
2. Conduct an Arbor Day in cooperation with the elementary school and assist in community tree planting efforts.
3. Maintain a bulletin board of available jobs and organize a "careers day" highlighting those related to land use management.
4. Arrange for urban students to gain practical experiences on rural lands or school facilities.
5. Participate in a Soil Conservation Essay Contest.
6. Grow and sell seedlings, operate a school nursery, investigate the house plant

Goals	Ways and Means	Amount budgeted	Date to be accomplished
1. All members participate with land use exhibit at county fair.	1a. Establish an exhibit committee		Jan 1
	1b. Contact County Fair Board for space		Feb. 15
	1c. Determine type of exhibit		
	1d. Provide recognition at awards banquet	$50.00	May
2. Environmental management students conduct one major project to inform the community about the need for management of the environment.	2a. Identify and make a list of other community groups who are concerned with the quality of the environment.		Feb. 1
	2b. Select a committee to contact all other community concerned environmental groups to explore interest and cooperation.		Feb. 15
	2c. In cooperation with other environmental groups work out details for the program.		Feb. 25
	2d. Present proposed project to chapter membership for approval.		March
	2e. Identify the details to be accomplished and assign responsibilities to appropriate committees. 1. publicity 2. program 3. refreshments 4. clean-up	 $10.00 $20.00 $35.00	
	2f. Conduct the project.		April 1
	2g. Write notes of appreciation to all groups who assisted.		April 5
	2h. Evaluate the results		April 15

industry, or sell firewood.

7. Establish a cooperative for any of the following purposes:
   a. hog cooperative for raising and selling hogs
   b. buying seeds and livestock
   c. purchase of equipment
   d. beekeeping
8. Conduct demonstration plots of crops, different fertilizer rates or seeding rates.
9. Provide a soil testing service for the community.
10. Assist in taking water samples and/or testing water in the community.
11. Participate in community park construction or maintenance and make a community survey to determine needs for parks and other local recreational facilities.
12. Conserve water and soil by constructing cover crops, contours or water bars.
13. Present speeches and slide shows to community organizations to explain land use and set-up displays at local shopping centers.
14. Conduct recreational meets with other schools in such areas as orienteering, tree identification contests, soil judging and other land use skills.

This is only a partial collection of numerous activities that help add practicality and realism to the study of land use. Many of these activities are being used in Vermont. Ideas of activities help get us started, but sometimes teachers find they are not familiar with a particular activity, yet know it would be worthwhile. This is when a resource person could be very helpful. Resource people may include individuals in the community such as retired people, members of local planning boards, farmers and individuals whose hobbies center around land use topics. Once these people are invited to the classroom, you may find they have some good ideas about presenting the subject matter, such as the suggestion, "Well, if you come over to my place with your class, I'll show you how I'm preventing soil erosion!" Frequently such people can think of someone else knowledgeable in another subject area of concern, thus contacting one resource person in your community may lead to a series of positive events.

In searching for resources also contact state and national organizations. In Vermont, a good source list is the Vermont Natural Resource Council's publication entitled, Vermont Environmental Education Resources, compiled by Russell Agne. Below is a partial list of national organizations which can be of assistance: The American Forestry Association, 1319 18th St., N.W. Washington, D.C. 20036; National Vocational Agriculture Teachers Association, Box 4498, Lincoln, NB 68500; National FFA Center, P.O. Box 15130, Alexandria, VA 22309; New England Natural Resources Center, 506 Statler Building, Boston, MA 02116; National Wildlife Federation, 1412 18th St., Washington, D.C. 20036; Audubon Society, 1130 Fifth Ave., New York, N.Y. 10028; Nature Conservancy, 1800 North Kent St., Arlington, VA 22209; US Department of the Interior, Bureau of Outdoor Recreation, Washington, D.C. 20250; US Department of Agriculture, Office of Information, Washington, D.C. 20250; US Environmental Protection Agency, 2203 JFK Federal Building, Boston, MA 02203.

Last, but equally important, are the many books, catalogs, and magazines from publishing companies, agencies and organizations. Below is a partial list of helpful materials sources for the land use instructor: American Association for Vocational Instructional Materials, Engineering Center, Athens, GA 30602; National Fire Protection Association, 60 Battery March St., Boston, MA 02110; Instructional Materials Program, California State Polytechnic University , San Luis Obispo, CA 93401; National Farm-City Council Inc., Kiwanis International Bldg., 101 East Erie St., Chicago, IL 60611; The Interstate Printers and Publishers, 19-27 North Jackson St., Danville, IL 61832; Ohio Agricultural Education, Curriculum Materials Service, Ohio State University, Rm. 254, 2120 Fyffe Rd., Columbus, Ohio 43210; Vocational Agriculture Service, College of Agriculture, University of Illinois, 434 Mumford Hall, Urbana, IL 61801.

To sum up the concerns of vocational agriculture in land use, read Russell Lord's The Care of the Earth (New York, Mentor Books, 1962), a history of husbandry over the centuries. For the student seeking a career in this field, see Occupational Preparation in the Natural Resources, published in 1973 by the Department of Agricultural Education at Pennsylvania State University. Encouraging vocations in land care can be vital to Vermont's future land use.

4-H CLUB PROJECTS FOR LAND USE STUDY

Sonja Stevens

To pursue land use projects all 4-H participants should have, at the very least, a general understanding as to what is involved in land use studies. This should include a brief, general study of ecology which relates man and his effects on the environment with the natural occurrences of the same area. Detailed study is not necessary, but the brief overview helps club members to associate their own projects to land use. An excellent, fun book which teaches younger children concepts of ecology is eco-antics by Mabel A. Hammer-Smith and Laura Watkins and available from the Girl Scouts of the U.S.A. Following this generalized introduction to the subject, club members may choose any of several projects to help them experience a part of land use. One must remember that land use projects vary according to the age of the members and the location of the immediate community.

Youth in country and suburban areas might choose home gardening as a project in land use. Younger members may simply learn how the vegetables they enjoy actually grow. Older members may include several aspects of gardening such as preparing and testing soil, planning plant space, caring of plants, harvesting at proper time, and even preserving the produce by canning, freezing or drying. An interesting community service project involves older youth club members going to the homes of senior citizens and, with their permission, planting gardens in their backyards. The youths also care for the gardens and help with the harvest. This provides the senior citizens with fresh vegetables of their choice. The young people receive great satisfaction, and there develops a better understanding between the young and old. One such successful project was reported by James V. Miller, "Neighbors" (Woman's Day, August 1975, p. 132).

Making club members aware of and involved with community planning can be a year-long project. Participants may start by studying land use in their immediate surroundings. Then they can learn about the different uses of land in their own community. Later members may visit with local community planning commissions to see if any long-range plans for their own community are being considered. Pros and cons of controversial land use decisions can be discussed and reasons for these decisions studied. Some may wish to learn how the pattern of their own town developed. Air photos and maps available for several different years, are helpful in studying changes in a community. Air photos also help club members develop models of their own area. Use of various colors for the different years illustrated in the model or map help to determine when large changes occurred in the community. Complex, scale model constructions or simple mapping on large sheets of newsprint help the youth understand changes in land use. From the constructions or conversations, members may realize that in the past very little planning occurred in their home towns or cities. Simulation games may be used here to evoke discussions of good or poor planning.

After becoming familiar with community planning, members may construct their own "ideal town". This imaginary, ideal town on paper should include industrial, housing, recreational, open, commercial, and natural land use. Land for water reservoirs, sewage plants, schools, etc. may be grouped together as public land. Club members will soon realize that one's own concept of an ideal town is not necessarily his friend's ideal place to live. Since personal values are involved, the necessity of building only one town per club creates many discussions, perhaps some heated, about the appropriation of lands.

Now participants should be quite aware of the problems of planning a community which provides a balanced environment and satisfactory ecology. The members may next attempt to bring the community together to consider and become aware of the ecological problems in their own locality. This may be the hardest portion of the year's project. The public is often willing to listen but not willing to take an active part. Thus, club members can make posters, go door-to-door , and otherwise publicize any of the pending

actions of their community leaders. This is an extensive project but should bring a great deal of satisfaction when completed. This project also provides community service.

If a community does not have a nature study area, this can be a continuing project for local clubs. First the club should contact the planning commission to see whether a nature study area is included in its future plans. If there is a designated area for the future, perhaps the club may get approval to start work helping to plan the types of study feasable in the area. Perhaps actual work in the area may be permitted if it is known that there is an active interest. Clubs should consider future use of the area by schools. This project involves all ages, and again can be considered community service. If there is no designated area in community plans, the club may promote such an area, and with success continue the project when such an area becomes available.

Orienteering may be a separate club project or may be combined into the nature study area project. Members combine the knowledge in the use of maps, air photos, and compass with outdoor activities such as hiking, skiing, or snowshoeing. If participants have a great deal of interest and enjoy outdoor activity, a camping experience can be included. Members may first map out an unfamiliar route which will include an overnight stay. It is advisable for the leader to try the route before the time of the trip. By use of the compass and maps or photos, club members should be able to reach their destination.

Some communities have water available for recreation, but due to pollution these waters may be no longer acceptable for many activities. Clubs in such communities can initiate and campaign for the return of clean water. Causes of the pollution, which may include poor land use practices, must first be studied and actual testing of the water completed. This project must gain community support. If the water area is a stream or river it may involve many communities in a joint effort. More information may be obtained from the Adopt-a-Stream Program.

If a club owns land, a continuing project involves tree farming. Tree farms may vary in size. They are managed forests which produce forest products. Since few clubs own land, perhaps permission to plant trees may be obtained from a land owner in the community. For detailed literature clubs may write to the American Forest Institute, 1619 Massachusetts Ave., Washington, D.C. 20036.

The above projects are only a few examples of the many available dealing with land use. Others, such as air or noise pollution, may appeal to club members in large cities. The most difficult task in starting a group project is the actual selection of the project. Additional information and resource materials may be obtained from the following sources:

Chevron Chemical Company, Ortho Division-Garden and Home, 200 Bush St., San Francisco, Ca. 94104

Educational Services, Girl Scouts of America, 830 Third Ave., New York, N.Y. 10022

Garden Clubs of America, 598 Madison Ave., New York, N.Y. 10022

Garden Way Associates, Charlotte, Vt. 05445

Kerr Glass Mfg. Corp., Dept. 997, Sand Springs, Ok. 74063

Vermont Extension Service, Publications Office, Morrill Hall, Burlington, Vt. 05401

4-H Publications, Cooperative Extension, New York College of Agriculture, Cornell University , Ithaca, N.Y. 14850

LAND USE STUDY IN THE HUMANITIES CURRICULUM

Noel Ring

"One generation passeth away and another generation cometh, but the Earth abideth forever."

Ecclesiastes

Everywhere throughout time elements of the physical and cultural landscape capture the attention of artists and scientists, scholars and philosophers, all of whom work to remind us of our heritage, inspire our curiosity, prompt sensual appreciation and promote spiritual values. New Englanders respond to the environmental patterns evoked by Henry David Thoreau's musings beside Walden Pond or Ralph Waldo Emerson's "Nature," the prose and poetry of Nathaniel Hawthrone or Robert Frost, the music of Aaron Copeland or Charles Ives, and the landscapes of Thomas Cole or Grandma Moses. These interpret the land to us and we, in turn re-interpret it through the perspectives and insights derived from the humanities.

To more fully understand the values we associate with land use, to more clearly convey our attitudes and to more effectively explore the possibilities of change, the self-expressive portion of the school curriculum may offer the best opportunities for examination of land use patterns. The order and character of our landscape preferences are clearly expressed in elements of urban design: gridded streets, village greens or plazas, malls, parks, etc.; by distinctive land survey patterns: metes-and-bounds, rectilinear blocks, townships-and-ranges, etc.; in aspects of architecture: saltbox or ranch houses, highrises, condominiums, building materials, shutters, patios, gazebos, etc.; and by a wide variety of barnstyle features: attached or unattached to houses, side or end-doors, round or square silos, cupoloes, etc. Our vernacular architecture reflects the regional character of our cultural preferences as well as regional variations in physical environmental conditions. So, too, do literature, music, photography, and other artistic creations extend our landscape in geographic imagery, as do foods, folklore, and language.

Teachers wishing to focus on this theme in visual arts classes might examine a number of design theroy references: Ian Nairn's The American Landscape (New York, Random House, 1965), Ross Parmenter's The Awakened Eye(Middletown, CT, Wesleyan University, 1968), or Robert Sommer's Design Awareness (San Francisco, Rinehart, 1972). A finer focus on design application can be gleaned from such books as Ian McHarg's Design with Nature (Garden City, Doubleday, 1971), Christopher Tunnard and Boris Pushkarev's Man-Made America (New Haven, Yale University, 1963), or, the very provocative US Forest Service Agricultural Handbook No. 462, National Forest Landscape Management, Vol. 2, Chapter 1: "The Visual Management System," GPO Stock No. 0101-00358. A slim booklet full of color photos and drawings, this item is well worth ordering in quantity from the Superintendent of Documents. It is a blend of the viewpoints of artist and naturalist.

A provocative theme for examining man-land relations is the question of design harmony between cultural and physical landscapes. The famous architect Frank Lloyd Wright had a genius for blending both, as has Mario Pei, who emphasizes this theme by use of local building materials. Their works are worth studying as is a modern classic, John Simond's Landscape Architecture (New York, McGraw-Hill, 1961).

Although a number of colorful pictorial publications of Vermont are available as tourist souveniers, they may also inspire a recognition of land use patterns in the Green Mountain State. An obvious source of visual imagery is Vermont Life. So, too, on a national scale is the fine selection of landscape art in Alan Gussow's A Sense of Place: The Artist and the American Land (New York, Saturday Review Press, 1972), which can be augmented by a Volume II illustrated show catalogue from the Joslyn Art Museum of Omaha, Nebraska. Another art history book of universal value is Kenneth Clark's Landscape Into Art (London, J. Murray, 1952).

Of the many works published on urban design as well as on corrollary facets of architectural styles, perhaps those by Lewis Mumford, Constantinos Doxiadis, Kevin Lynch

and Sybil Moholy-Nagy are most useful for general reference, as are any of J.B. Jackson's works, including issues of the journal, Landscape. Very little has been written for the benefit of teenage readers and even less for younger children. However, teachers and club leaders can use the local environment to promote an awareness of settlement design elements. Group and individual field observations and study of air photos will reveal many of these. Student's own designs,photography, and painting or scale-model projects are obvious creative products of such study.

Instructors of English can welcome appropriate examples of landscape literature, organized thematically and historically, in John Conron's new anthology, The American Landscape (New York, Oxford University, 1974), which includes striking illustrations. Lew Marx also examines our literary heritage in The Machine in the Garden (New York, Oxford University, 1964). Regional literature by topical and locational themes is found in Otis Coan and Richard Lillard's America in Fiction (Palo Alto, Pacific Books, 1967). Any good poetry anthology provides examples of land use patterns as interpreted by American writers, eg. X.J. Kennedy's Messages (Boston, Little, Brown, 1973).

Perhaps one method of encouraging observation of local land use patterns would be the request that each student write a prose passage describing their community as viewed by "a Martian passing overhead in a flying saucer." Or, in a sentimental vein, a "my town" in verse on the model of Carl Sandburg's "Chicago" or William Carlos Williams' "Patterson." The latter poet's "The Right of Way" makes a very interesting contrast in landscape perception as compared to W.H. Auden's "O, Where Are You Going?" Listening to appropriate music, eg. the sounds of Ferde Groffe's "Grand Canyon Suite" or the lyrics of many modern folk songs and popular recordings, can incite written description of the landscape as can, of course, viewing paintings and photographs. Students might record local outdoor sounds and animal tracks and categorize them by land use patterns. Similarly, individual creativity might be prompted by imaginatively viewing the land as seen by a bird, a deer, or a "reincarnated former resident," perhaps in the style of Mark Twain.

In the realm of philosophy, sensual, spiritual and historical themes can serve to inspire youth to re-examine their environment from new perspectives. The following books should appeal to both teachers and older youths: Lawrence Durrell's Spirit of Place (New York, Dutton, 1971), Rene Dubos' A God Within (New York, Scribner's, 1972), Steve Ewing's Man, Religion, and the Environment (Dubuque, Kendall/Hunt, 1975), Hans Huth's Nature and the American (Lincoln, University of Nebraska, 1972), Freeman Tilden's Interpreting Our Heritage (Chapel Hill, University of North Carolina, 1967), the anthology compiled by Robert Detweiler et al., Environmental Decay in its Historical Context (Glenview, Scott, Foresman, 1973), and William H. Whyte's The Last Landscape (Garden City, Doubleday, 1968).

A Bicentennial celebration might best be tempered by an attempt to realistically view our heritage of American land use. Several publications serve to present a balanced variety of views related to general and local land use practices. In a very historic sense, for Vermonters a re-reading of the works of George Perkins Marsh should be indicated. Three Bobbs-Merrill reprints offer interesting viewpoints: Warren Scoville's "Did Colonial Farmers 'Waste' Our Land?" (H-191), Walter Firey's "Sentiment and Symbolism as Ecological Variables" (85), and Lester Klimm's "The Empty Areas of the Northeastern United States." Initial concern for proper land use is well recorded in the SCS booklet, Early American Soil Conservationists (MP-449). However, New England's first European settlers rapidly stripped the forest for energy: in early days, charcoal served to heat the home and fuel the blacksmith's forge for the expanding iron industry. The energy crisis is not new as an influence on land use.

Vermont pioneers similarly ravished the timber resources by rapid denudation for the pot and pearl ash industry, which is recorded in Stewart Holbrook's Yankee Loggers (New York, International Paper Co., 1961). Later, the wave of enthusiasm for merino sheep and textile milling resulted in another rash of land clearance (See statistics on page 8). Results of historic change in land use patterns can be vividly seen in the centerfold photographs. Our heritage gives us perspective as to the scope of land use planning for the future.

Several American geographers have examined our environmental attitudes, perceptions and values in historical and philosophical context, which can readily be applied to land use policies and practices. Clarence Glacken's monumental survey, Traces on the Rhodian Shore (Berkeley, University of California, 1967) analyzes Western thought on man and nature from antiquity through the 18th century . A more recent coverage is found in his "Man Against Nature: an Outmoded Concept," available as a Bobbs-Merrill reprint. Yi-Fu Tuan's provocative Topophilia (Englewood Cliffs, Prentice-Hall, 1974) offers yet other world views. David Lowenthal has written a number of works on landscape perception and several are available as Bobbs-Merrill reprints. His book, Environmental Perception and Behavior (Chicago, University of Chicago, 1967, Department of Geography Research Paper No. 109) includes reference to children's spatial perceptions.

In summary, land use is an integral part of the cultural landscape as an inseparable expression of perceptions, attitudes and values. These are both historical and spatial in character, manifesting themselves throughout our art, architecture, settlement design, music and literature. In Vermont, we regard our landscape as unique, yet know that elements of it have both origins and diffusions elsewhere. Expressions of our value of this landscape, in forms associated with the humanities may be singularly powerful in molding public opinion, policy and practice as to land use, just as great novels have influenced the course of history.

Additional References and Resources

The National Council for Geographic Education has published several useful teacher's guides: Cole, Richard, A New Role for Geographic Education: Values and Environmental Concerns, Do It This Way, No. 9, and two items by Rodney Allen, Environmental Education as Telling Our Stories, Instructional Activities Series IA/S-14, and "This World is So Beautiful...": Feelings and Attitudes in Environmental Education, Instructional Activities Series IA/A-15.

The Council of Planning Librarians publishes many bibliographies of great value. The high school library might well subscribe to their service, P.O. Box 229, Monticello, IL 61856. Two exchange bibliographies of particular utility are Cunningham, Michael, "A Selected Bibliography on the Relevance of Environmental Education to Secondary School Curricula," April 1972, No. 274, for $6.00 and Vance,Mary, "New Publications for Planning Libraries, List No. 9: Land Use," 1975, No. 828, a good investment of $1.50. The former includes data on agencies, journals, literature, audio-visual materials and games.

LAND USE REFERENCES

Land use references of both utility and special interest include Richard F. Babcock, The Zoning Game (Madison, WI, University of Wisconsin, 1966); Vernon Carstenson, ed. The Public Lands. Studies in the History of the Public Domain (Madison, University of Wisconsin, n.d.); Marion Clawson, America's Land and its Uses (Baltimore, John Hopkins, 1972); Richard Ely and George Wehrwein, Land Economics (Madison, University of Wisconsin, 1964); Robert Fellmeth, Politics of Land (N.Y., Grossman, 1973); Niles M. Hansen, The Future of Non-Metropolitan America (Lexington, MA, Lexington Books, 1973); and Christian Norberg-Schulz, Existence, Space and Architecture (N.Y., Praeger, 1971).

Also consult the USDA's Land Use Planning Assistance (GPO Stock No. 0101-00366, February 1974 at 60¢) and Environmental Thrust Handbook (see your Extension Agent); Bevins, Malcolm I. Attitudes on Environmental Quality in Six Vermont Lakeshore Communities, Burlington, UVM, 1972, Northeast Regional Research Bulletin 671 (order from UVM Extension Service); the EPA's Don't Leave It All to the Experts (GPO Stock No. 0-478-748, at 55¢); and the US Senate's State Land Use Programs, 1974 (GPO at $1.35). Obtain a copy of Planning, Zoning and Sub-division: Process, Problems, Issues from the Vermont Agency of Development and Community Affairs in Montpelier and visit the State Library, which has catalogued environmental materials.

Contributed by Eileen Driscoll

ENVIRONMENTAL EDUCATION FOR LAND USE PLANNING

Noel Ring

Democracy demands an informed citizenry for effective direction of land use planning, a complex political process requiring the best of environmental education. In Vermont as elsewhere, citizens' values will determine policies and practices as they did in colonial days when Governor Benning Wentworth attempted to apply his ideas of settlement design, as noted by Robert M. Carter (op. cit., p. 28):

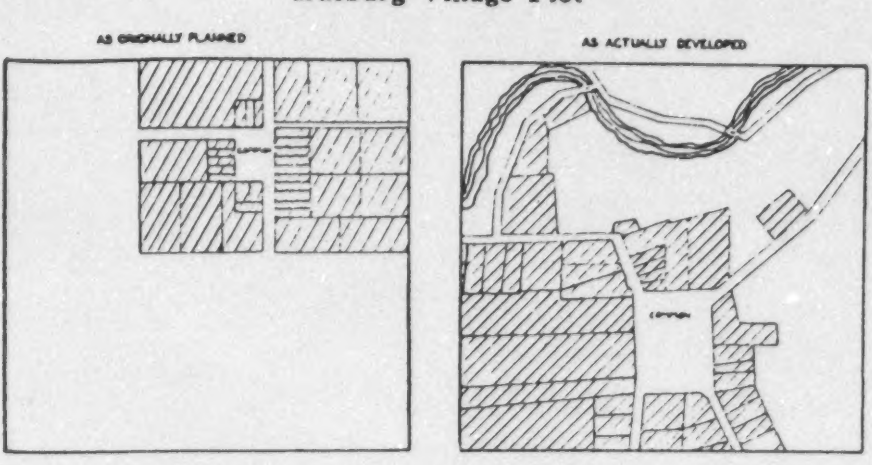


FIG. 12. While lots 112 and 113 near the center of the town were laid out as a village in advance of settlement, development actually took place on the adjacent lots 127 and 128.

If planning is not new to Vermont, understanding of its proper determination management, scope and application still eludes many concerned citizens. This guide highlights the importance of individual human values, as especially emphasized by Russell M. Agne and Robert J. Nash in their provocative article, "Environmental Education: A Fraudulant Revolution?" (Teachers College Record, Vol. 76, No. 2, December 1974, pp. 304-315). An appropriate introduction to values would be Vermont poet William Mundell's works, particularly "Both Sides" and "Another Time" from Hill Journey (Brattleboro, Stephen Greene, 1970) or "Private Transaction" and "Late to Town" in Plowman's Earth (1973).

Among the several environmental education programs in Vermont, at Champlain Valley Union High School in Hinesburg, "students participate in two simulation games, one (Extinction) familiarizing them with ecosystem dynamics and the other (World Game) with the interaction between natural resources, population and capital," reports teacher Garrett Hughes. In addition, a major course project is to find and photograph a local natural area and present results at the end of the term. At the junior high level, John Cross' students at Lyman C. Hunt School in Burlington studied animal uses of land and developed a nature trail in Ethan Allen Park for use by elementary children for whom they served as guides. Many land study applications of maps and air photos are conducted at South Burlington Middle School by Mrs. Jean Stone and Mrs. Irene Thomas. Guide contributors sharing their experiences include David Orr of Shelburne Middle School, David Van Vleck of Middlebury High School, Gilbert Wideawake of Rutland Vocational-Technical Center, and Sonja Stevens, Williston 4-H leader.

Regretably, environmental education is not a mandated subject throughout Vermont, though notable programs exist in school systems at Bellows Falls, Brandon, Concord, and White River Junction. John Stevens, coordinator at the State Department of Education in Montpelier, can ably assist in many ways (see p. 25). Rather than compartmentalizing land use concerns into one environmental subject area, this guide and project aim at interdisciplinary, multilevel approaches to training future citizens for effective participation in land use planning. Among teaching techniques, simulations and games appear especially appropriate in offering opportunities for revealing group dynamics, individual value systems, and personality influences upon the planning process.

Sources of simulation/games: 1) for access to the expensive, computerized community land use game (CLUG), contact William Stone, UVM Extension Service, or the Burlington Free Press, 2) the US Forest Service's Teaching Materials for Environmental Education (GPO Stock No. 0101-0234, July 1973 at 95¢) contains a model land use game; the American Forest Institute's "Indian Valley" game costs a mere 20¢, 3) both Russell Agne, UVM College of Education, and Thomas Hudspeth, UVM Environmental Studies Program, can provide guidance, the latter is active in sponsoring game-oriented workshops at Camp Keewaydin.

Regarding audio-visual aids, write to the Cooperative Extension Service, College of Agriculture, University of Connecticut, Storrs, CT 06268, for A Guide to International Films, Filmstrips, and Slide Series Useful in Community Resource and Development (67-T05). The Vermont Council on the Humanities and Public Issues (Main St., P.O. Box 58, Hyde Park, VT 05655) has produced two excellent films: "Duxbury Town Meeting - A Town Faces Change" and "Last Stand Farmer," available through the State Library A-V Unit, RFD 4, Montpelier, VT 05602 and the UVM Media Center.

Professional organizations and their publications provide important guidance: National Association for Environmental Education, 5940 SW 73rd St., Miami, FL 33143; National Council for Geographic Education, 115 N. Marion St., Oak Park, IL 60301; and Journal of Environmental Education, Heldref Publications, 4000 Albemarle St., NW, Washington, D.C. 20016. The Primary Environmental Education Project (PEEP, 206 Dudley Hall, University of Georgia, Athens, GA 30602) offers valuable publications as does the Geography Curriculum Project at the same address, eg. "Comparative Rural Landscapes." Several useful commercial publications are available from Data Courier, Inc., 620 So. Fifth St., Louisville, KY 40202.

A final admonition from the National Wildlife Federation's To Save the Earth pamphlet by Franklin Gross and Dennis Corso: "Don't get trapped into spending a lot of time gathering tons of material. Start with a few good things, and let your own needs determine where you go from there." From the hundreds of selected references herein, teachers and club leaders will advisedly choose those most suitable to the youth they serve. A cardinal goal of the "Landscapes of Vermont" project is the application of free and inexpensive materials to locally-oriented land use studies in Vermont. Additional, general references are designed for building basic understandings. The most important of all activities is a careful observation of land use patterns in your own community, yesterday and today, and assessment of the values which produced these landscapes, with a view toward participating in the best of land use planning for tomorrow.